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JOURNAL  
OF THE EAST AFRICA NATURAL HISTORY SOCIETY  
AND CORYNDON MUSEUM

VOL. XXIV No. 1 (105)

June 1962

CONTENTS

	<i>Page</i>
Common Perennial Lilies of Kenya By R. Polhill	1
Flowering Plants of Ngong Hills By S. Heriz-Smith	26
Report on a Collection of African Slugs (Urocyclidae) By B. Verdcourt	29
Two Interesting Plant Records from East Africa By B. Verdcourt	37
Notes on the Migration and Dispersal of Birds at Kitui By J. R. M. Tennent	41
Bau Petroglyphs By A. T. Matson	43
Newly found Bau Petroglyphs and the Masai Game "Ngeshui" By Claud Hamilton	50
New African Lepidoptera By R. H. Carcasson	54
Nature Notes: Abdim's Storks, E. J. Blencowe	64
Grey Plover, E. J. Blencowe	64
Pink footed Puff-backs, E. J. Blencowe	65
Unusual Birds at the Coast, H. J. Lee	66
Early arrival of Caspian Plover, H. J. Lee	66
Letters to the Editor	53 & 65
Book Reviews	67
Bird Ringing for 1960/61, by E. J. Blencowe	74
Appreciations	75
Announcement	25

(Published 1/9/1962)

Price Shs. 20/-



# EAST AFRICA NATURAL HISTORY SOCIETY AND CORYNDON MUSEUM

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As this Journal is to be a joint publication with the Coryndon Museum it will in future be entitled the Journal of the East Africa Natural History Society & the Coryndon Museum.

The cost of publishing the Journal by the normal printing methods has got to the stage when it is becoming too great for the slender resources of the Society and in the hope that the cost of publishing can be reduced the Journal will be published by using the photo lithographic process. This number has been produced by this process and in order to keep the volumes uniform this issue will appear as Volume XXIV No.1 (105).

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**Nomenclature.** Where a recent standard work for the area is available (e.g. Praed and Grant for birds) the names given there (both English and scientific) should be used. Initial capitals should be used for specific English names, e.g. Pied Wagtail and small initial letters for group names, e.g. wagtails. Scientific names must be underlined. Where an English name is used, it is normally advisable, on first mention, to add the scientific name to avoid misunderstanding.

**References.** These are usually abbreviated in the text and listed more fully in alphabetical order of authors at the end of the article. For example, in the text a book reference might be (Jackson 1938: 1 p. 24); a periodical reference might be (Pinhey 1956: p. 20). At the bottom of the contribution: Jackson, F.J., 1938. Birds of Kenya and Uganda. Pinhey, E.C.G., 1956. The Emperor Moths of Eastern Africa. Journ. E.A. Nat.Hist.Soc. XXIII No. 1 (98). With short articles it may not be worth making a list of references at the end, but the whole reference in the most abbreviated comprehensible form should then be inserted in the text.

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## COMMON PERENNIAL LILIES OF KENYA WITH EPHEMERAL FLOWERING SHOOTS

By

R. POLHILL  
(E.A. Herbarium)

These plants form a conspicuous and attractive feature of the flush of herbs, which appears fleetingly after the first rains. Members of the Liliaceae can easily be distinguished from other families of showy flowered monocotyledons of the same type, by the following key:-

- 1a. Petal-like perianth segments inserted below the ovary.....2
- 1b. Petal-like perianth segments inserted above the ovary.....Iridaceae, Amaryllidaceae, Hypoxidaceae
- 2a. Perianth segments all similar, if not in size, then in colour and texture.....Liliaceae
- 2b. Perianth segments dissimilar, three coloured, petal-like, three smaller, green, sepal-like.....Commelinaceae

I have included here all the Kenya genera, except Asparagus and Aloe, although a few species, mostly forest ones, have rather more persistent flowering shoots; conversely the odd species of the excluded genera has rather short lived ones. In any case, it will be seen that plants with underground storage organs, which persist and to a certain extent spread vegetatively for a number of years, sending up shoots which flower and set seed within a few weeks, make up a substantial part of the family. This life-form is well adapted to the many dry parts of Kenya with infrequent and scanty rain and also clayey soils, such as black cotton and 'mbuga', which have a large run-off in the rains and a very poor tilth in the dry weather. They are again found commonly on shallow soils overlying rock such as are found along the sides of many river valleys. These sills catch a good supply of rainwater, but rapidly lose it again by evaporation.

The underground organs not only provide a number of useful characters for classification, but also have a more general biological interest in showing the ways in which different parts of the plant have become modified. Some have bulbs, which are made up of swollen leaf bases, others have corms, which are swollen stems, and yet others have rhizomes, which are also stems, but spreading and root-like, often swollen into stocks at the base of the shoots of each successive year. The appearance of all these is very diverse and in addition the roots are often modified as well, some stringy with potato-like tubers, others fleshy and tuberous to varying degrees. So many collectors pick off a shoot at ground level, that these differences have often been of little use to the herbarium worker. I have not hesitated to make what use I can of these characters in the following keys and notes, and it may be added that carefully dug up specimens of various species from the remoter parts of Kenya, which are inaccessible to many during the rains, are still wanted for the herbarium. In all

## Perennial Lilies

cases they often facilitate naming. Exact colour of the flowers and specimens of ripe fruits also provide useful characters - for instance, the genera Anthericum and Chlorophytum are primarily defined on the shapes of their seeds.

Partly because of the inadequate material of early collectors and partly because a number of the genera are large with species varying considerably in height, leaf development and, to a lesser extent, in hairiness and flower size, which cannot be appreciated without a number of specimens, the taxonomy has become somewhat confused. It may be expected that a number of names will have to be altered when a much needed revision is undertaken - the last general account, for the Flora of Tropical Africa, appeared in 1898. A limited synonymy of names previously in botanical usage is given in the index.

The material in the East African Herbarium was carefully worked over a few years ago by Mr. Rayner, a prominent member of the Society, and has made the preparation of this article much easier. I am also grateful to members of the East African Herbarium and Mrs. S. Holmes, of the Royal Botanic Gardens, Kew, for advice and help with the nomenclature, and in particular to my mother, Mrs. Evelyn Polhill, for the great care she has taken over the preparation of the habit sketches of living plants, used in the illustrations, which form a most valuable part of this account.

### KEY TO THE GENERA

- 1a. Intricately branched herbaceous climber; stem leaves reduced to scales ..... Bowiea
- 1b. Not climbing or if so, rarely branched and with well developed stem leaves..... 2
- 2a. Leaves tapering into tendrils, crowded on a well developed stem.....Gloriosa
- 2b. Leaves not forming tendrils, all basal or rarely a few on a diminutive stem.....3
- 3a. Styles three (Figs. 2, 23).....4
- 3b. Styles one.....5
- 4a. Bracts large and showy, sheathing small flowers with inconspicuous perianth segments..... Androcymbium
- 4b. Bracts small, perianth segments white with two contiguous purple spots towards the base, in the Kenya species..... Wurmbea
- 5a. Filaments covered with long yellow hairs..... Bulbine
- 5b. Filaments not covered with long hairs.....6
- 6a. Plants with bulbs.....7
- 6b. Plants with corms, rhizomes or tubers, sometimes bulb-shaped, but not made up of swollen leaf bases.....14
- 7a. Perianth segments united into a tube at the base with the filaments inserted on the segments at the top of the tube.....8
- 7b. Perianth segments free.....11

- 
- 8a. Perianth united, the lobes dissimilar, the outer often developed into solid tails, the inner continued, more or less joined together, tube-like, only their tips free and spreading..... Dipcadi
- 8b. Perianth segments similar.....9
- 9a. Inflorescence small, spike-like; the flowers small, subglobose, greenish to white..... Drimiopsis
- 9b. Inflorescence various, but if spike-like, the plants robust with conspicuous flowers and spreading perianth segments.....10
- 10a. Perianth segments joined for about 1/5 of their length or less; the Kenya species with laxly arranged flowers and very short bracts; the perianth segments greenish to white, usually with a green or brown median stripe..... Urginea\*
- 10b. Perianth segments joined for about 1/4 of their length; the Kenya species with crowded flowers and conspicuous bracts; the perianth segments white, sometimes marked with mauve..... Drimia
- 11a. Flowers blueish to mauve; the leaves often spotted; the anthers small, nearly as wide as long; the filaments narrow, thread-like..... Scilla
- 11b. Flowers various combinations of white, green and brown; the anthers distinctly longer than wide; the filaments more or less expanded.....12
- 12a. Filaments joined to the base of the perianth segments, which are more often joined into a short tube; the seeds often with a conspicuous, membranous wing..... Urginea
- 12b. Filaments inserted below the ovary; the seeds orbicular to subglobose.....13
- 13a. Flowers bell-shaped, the inner perianth segments, at least, not much spreading even when mature; the seeds flattened, orbicular..... Albuca
- 13b. Flowers cup-shaped with spreading perianth segments when mature; the seeds supposedly subglobose or angular, but often rather flattened in the Kenya species..... Ornithogalum
- 14a. Perianth segments joined into a tube for most of their length, the flowers trumpet-shaped..... Kniphofia  
(N.B. Aloe, which would key out here, is excluded).
- 14b. Perianth segments free or almost so.....15
- 15a. Seeds hairy; the flowers often yellow, tinged red outside; plants growing from a subglobose tuber..... Eriospermum
- 15b. Seeds not hairy; the flowers whitish to green, sometimes with a brown stripe to the perianth segments; the plants variously rhizomatous.....16
- 16a. Seeds angular to irregular; the fruits three-angled or slightly grooved..... Anthericum
- 16b. Seeds flat, a few sometimes distorted by pressure in the capsule; the fruits three-winged..... Chlorophytum
- 

\* The Kenya species of Scilla also appear to have the perianth segments very shortly joined at the base, but then the flowers blueish to mauve.



## Perennial Lilies

### ALBUCA Linn.

Pedicels  $\frac{1}{2}$  in. long or less in flower, up to  $\frac{5}{8}$  in. long in fruit; usually flowering with the leaves well developed..... A. wakefieldii

Pedicels of the mature flowers more than  $\frac{1}{2}$  in. long, usually about  $\frac{3}{4}$  -  $1\frac{1}{2}$  ins. long, at least in fruit; small plants, flowering before the leaves..... A. pachychlamys

#### A. pachychlamys Bak.

Large bulb, surrounded by tough old leaf sheaths, crowned with wiry fibres. Flowering before the leaves appear. Peduncles short, usually less than 8 ins. tall, stout and slightly zig-zag. Bracts ovate-lanceolate, short, up to  $\frac{1}{2}$  in. long, much shorter than the pedicels, which are usually  $\frac{3}{4}$  -  $1\frac{1}{4}$  ins. long in flower, sometimes longer in fruit. Perianth segments white with a brownish purple median stripe, up to  $\frac{5}{8}$  in. long. Fruits ovoid-oblong, about  $\frac{3}{4}$  in. long, slightly three-lobed.

Rare, Machakos District.

#### A. wakefieldii Bak. Fig. 1

A very variable species, with bulbs 1 - 2 ins. across; the leaves strap-shaped, from a few to about 18 ins. long, sometimes hairy along the margins. Peduncles 6 ins. to 4 ft. long, with the flowers laxly arranged on short pedicels, up to  $\frac{1}{4}$  in., rarely  $\frac{1}{2}$  in. long, in flower; the upper bracts  $\frac{1}{4}$  -  $\frac{1}{2}$  in., the lower ones up to 1 in. long. Flowers nodding, bell-shaped, never opening fully, with oblong perianth segments,  $\frac{3}{8}$  - 1 in. long, with a broad green median stripe, yellowish then white towards the margin, sometimes entirely yellow, hooded at the apex. The filaments waisted where they clasp the top of the ovary in bud, tapered above. Fruits  $\frac{1}{2}$  - 1 in. long, slightly three-lobed, pointed at the apex.

Common in most parts of Kenya below about 8,000 ft.

The above description includes a wide variety of plants, but none of the characters appear to be sufficiently constant to suggest that more than one species is involved, except perhaps certain plants from the Northern Frontier Province with rather long, weak hairs on the leaf bases, named A. blepharophylla Cuf. Several varieties might be recognised, e.g. the coastal type, often tall with consistently large fruits and rather large greenish flowers, and one from the Kitui and Tsavo areas with bright yellow flowers, 1 in. long. The size of the plants, the hairiness of the leaves and the size of the flowers (which anyway increases considerably with age), vary widely throughout the country.

### ANDROCYMBIUM Willd.

#### A. melanthioides Willd. var. striatum (A. Rich.) Bak. Fig. 2

A small plant, from a few inches to nearly 1 ft. tall, growing from a small corm, with narrow basal leaves and a few very small leaves on the stem. Peduncles with about four clustered flowers, with very large sheathing bracts, 1 - 3 ins. long, white to greenish, conspicuously veined dark green to brown. Flowers small,  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, with yellow-green perianth segments clasping



the filaments; the ovaries with three styles. Fruits up to  $\frac{1}{2}$  in. long, with persistent styles.

Central highlands and Elgon area.

# ANTHERICUM Linn.

- 1a. Leaves arising from a prostrate aerial rhizome, which may be several feet long..... A. suffruticosum
- 1b. Leaves from an underground rhizome, forming a rosette at ground level.....2
- 2a. Inflorescences compound, repeatedly branched with numerous small flowers on long pedicels, the lower branches nearly as long as the continuation of the main stalk..... A. zavattarii
- 2b. Inflorescences usually without lateral branches, or if a few present at the base, then much shorter than the continuation of the main stalk and the flowers congested.....3
- 3a. Flowers single to a bract, never in groups; the inflorescences always lax; the pedicels well developed (sometimes longer than the peduncle); the roots tapering from a thickened base, without tubers.....4
- 3b. Lower flowers at least in groups of two to four, if rarely all single, then the pedicels short and the roots wiry, some with small potato-like tubers.....6
- 4a. Peduncles usually more than 6 ins. long with a number of flowers; the pedicels not stiffly spreading; the perianth segments with a brown median stripe; the filaments covered with small barb-like papillae..... A. kassneri
- 4b. Peduncles very short, or if a little longer (2-6 ins.), erect with a few stiffly spreading pedicels; the perianth segments pure white or with a greenish stripe; the filaments smooth.....5
- 5a. Pedicels longer than the peduncle, which is often hidden in the leaf rosette; the perianth segments wholly white..... A. angustifolium
- 5b. Pedicels shorter than the peduncle, which is 2-6 ins. long; the perianth segments with a green median stripe..... A. gregorianum
- 6a. Roots tapering from a thickened base; small plants less than 1 ft. tall; the peduncles shortly scabrid hairy on the upper part; the perianth segments without a median stripe; most of the flowers in groups of 2-4..... A. sp. (= Chlorophytum moniliforme)\*
- 6b. Roots wiry, some at least bearing potato-like tubers; the stalks hairless, or if roughened to hairy, then the perianth segments with a median stripe (A. subpappilosum and A. venulosum) or all the flowers except the lowermost single to a bract (A. taylorianum) .....7
- 7a. All except the lowest flowers one to a bract; the perianth segments wholly white, usually three-veined; the upper part of the peduncles shortly scabrid hairy..... A. taylorianum
- 7b. Majority of the flowers in groups of 2-4; the peduncles hairless or if roughened or hairy, then the perianth segments with a conspicuous median stripe.....8

\* This clumsy designation is necessary to avoid publishing a new name combination, which is undesirable in an article of this sort.

## Perennial Lilies

- 8a. Leaf bases with irregular purple splotches; the inflorescences lax; the peduncles flattened and narrowly winged, often zig-zig between the groups of 2-4 flowers, hairless..... A. uyuiense
- 8b. Leaf bases unspotted; the inflorescences congested or, if lax, the peduncles hairy.....9
- 9a. Perianth segments without a brown median stripe; the rather few flowers crowded at the top of the medium sized, hairless and narrowly winged peduncle; the leaves narrow, about  $18 \times \frac{1}{4} - \frac{1}{2}$  in..... A. zankebaricum
- 9b. Perianth segments with a brown or purplish median stripe; the peduncles roughened and almost wingless to hairy, or if hairless then robust plants more than 18 ins. tall with mature leaves  $\frac{3}{4} - 2$  ins. wide and many flowered, often branched, inflorescences.....10
- 10a. Peduncles smooth and hairless, markedly winged; robust plants usually more than 18 ins. tall; the mature leaves  $\frac{3}{4} - 2$  ins. wide.....11
- 10b. Peduncles minutely roughened and almost wingless to hairy and winged; the plants variable in size, but usually less than 18 ins. tall; the mature leaves less than  $\frac{1}{2}$  in. wide.....12
- 11a. Leaves markedly contracted in their lower part; the inflorescences usually with short lateral branches.....A. sp. near pterocaulon 1
- 11b. Leaves gradually tapered in their lower part; the inflorescences unbranched.....A. sp. near pterocaulon 2
- 12a. Peduncles shortly hairy along the margins, which are finely winged; the leaf margins also hairy; the mature inflorescences lax.....A. venulosum
- 12b. Peduncles minutely roughened (subpapillose), sometimes finely winged; the leaf margins hairless; the inflorescences short and congested.....A. subpapillosum

### A. angustifolium Hochst. ex A. Rich.

A small plant with tapering roots thickened to about  $\frac{1}{8}$  in. across at the base; the stocks fibrous. Leaves very slender, usually less than 5 ins. long and about  $\frac{1}{8}$  in. wide. Flowers few, on long pedicels, 1 - 2 (- 3) ins. long, much longer than the peduncle, which is often hidden in the leaf rosette. Flowers wholly white, star-like, with narrow segments, about  $\frac{1}{2}$  in. long. Fruits about  $\frac{1}{4}$  in. long, not deeply indented at the apex.

Short grassland, central highlands and Elgon area.

### A. gregorianum Rendle Fig. 3

A more robust plant than A. angustifolium; the roots thickened to about  $\frac{1}{4}$  in. across at the base; the leaves 3 - 9 ins. long. Inflorescences with a distinct peduncle, 2 - 6 ins. long. Bracts shorter than the stiffly spreading pedicels, which are up to  $\frac{3}{4}$  in. long. Flowers about  $\frac{3}{4}$  in. across, the perianth segments white with a three-veined, green median stripe. Fruits three-angled, shortly indented at the apex, about  $\frac{1}{4}$  in. long.

Short grassland, Nairobi, Machakos and Masai Dists.; Northern Frontier Province.

### A. kassneri Poelln. Fig. 5

Shortly rhizomatous, the stocks often bulb-shaped, fibrous; the tapering roots swollen, up to  $\frac{3}{16}$  in. across at the base. Leaves

up to 1 ft. or so long, usually fleshy, grooved down the inner side, 1/16 - 3/16 in. wide, sometimes hairy. Peduncles erect or often spreading and then ascending, 8 - 18 ins. long, sometimes hairy, the flowers well spaced, one to a bract. Bracts up to 1/4 in. long, the pedicels 1/4 - 1/3 in. long. Flowers vary from 1/3 - 3/4 in. across, the segments narrow with a conspicuous brown median stripe; with a faint sweet scent; opening only in the afternoon. Filaments and, to a lesser extent, the perianth segments covered with small barb-like papillae. Fruits small, almost globular, 1/4 - 3/8 in. long.

Northern Frontier Province, southern, eastern and central Kenya, from 3,000 to about 8,000 ft.

A very variable species, belonging to a complex group; possibly synonymous with A. oatesii Bak.

A. sp. ( = Chlorophytum moniliforme Rendle)\* Fig. 4

Rhizomes rarely branched and the stocks of successive seasons are close together, giving a necklace-like (moniliform) appearance; the roots thickened at the base, without tubers. Leaves usually about 6 ins. long, sometimes to 1 ft., the mature ones narrowed in their lower half, giving a petiole-like effect, very shortly hairy along the margins. Peduncles about 4 - 9 ins. long, shortly hairy, the flowers crowded on the upper part, the lower ones in groups of 2 - 4. Bracts 1/3 - 3/4 in. long, hairy; the pedicels short, rarely exceeding 1/4 in. Flowers 3/4 - 7/8 in. across, white, buff tinged near the apex outside. Fruits about 1/4 in. long, three-angled, not deeply indented at the apex; the seeds three-angled.

Grassland, medium altitudes (3-8,000 ft.), southern, central and western Kenya.

Very close to A. subpetiolatum Bak., an earlier described species, with hairless leaves and peduncles. This character may not prove to be constant when more material is examined.

A. sp. near pterocaulon Welw., I

Rhizomes with many fine roots. Leaves 1 - 2 ft. long, hairless, markedly narrowed in their lower part, 3/4 - 2 ins. across. Peduncles 18 ins. - 4 ft. long, flattened, with a narrow wing up either side, often with several short lateral branches. Flowers crowded and grouped several together. Bracts variable, the upper ones short, boat-shaped, the lower ones long; the pedicels about 1/4 in. long. Flowers white, about 3/4 in. across, ? with a median stripe to the segments. Fruits about 3/8 in. long, transversely wrinkled, three-angled, not deeply indented at the apex.

Forest, coastal.

A. sp. near pterocaulon Welw., 2

Underground parts not seen. Leaves up to 30 x 3/4 in., hairless, tapering downwards, but not markedly contracted. Peduncles to about 3 ft. long, the inflorescences not branched in the material seen, but long bracts scattered below the congested inflorescence. Flowers similar to A. sp. near pterocaulon I. Fruits not seen.

Turkana District.

A. pterocaulon differs from both the above species, by having narrow, folded, recurved leaves.

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\* see footnote p. 5



A. subpapillosum Poelln. Fig. 6

Stocks of successive years contiguous, forming a thick irregular rhizome; the roots stringy, some with small, distant, potato-like tubers; the stocks fibrous. Leaves 6 - 15 ins. long and up to  $\frac{3}{8}$  in. wide, narrowed in their lower part, bluey-green, the veins close, rib-like, subpapillose under a lens, but hairless. Peduncles flattened, more or less narrowly winged, roughened (subpapillose) on the upper part; the flowers usually rather few, crowded towards the top, at least the lower ones in groups of 2 - 3. Bracts small, boat-shaped, less than  $\frac{1}{4}$  in. long; the pedicels short about  $\frac{1}{4}$  in., sometimes  $\frac{1}{2}$  in. long. Flowers  $\frac{3}{4}$  - 1 in. across, the perianth segments white, with a green to red-brown median stripe, fading dull crimson-lake. Anthers oblong, crinkly-edged when dried out, longer than the filaments. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, bluntly three-angled, scarcely indented at the apex, transversely wrinkled.

Masai, Machakos, and Nairobi Districts, north to Mt. Kenya and Mathews Range, also the Elgon area, from about 5-7,000 ft.

A. suffruticosum (Bak.) Milne-Redhead

Prostrate, branched, aerial rhizomes, about 1 in. thick, up to several feet long, from which the rosettes of leaves arise, quite unlike any other species of the genus. Flowers white with a greenish or brown stripe.

Coast and rocky outcrops inland to the Tsavo area.

A. taylorianum Rendle

Stocks small with short rhizome connections; the roots wiry with small distant, potato-like tubers; the fibrous remains of the old leaf bases usually rather few and fine. Leaves narrow, 6 - 18 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., the margins shortly hairy and usually wavy. Peduncles 6 - 12 ins. long, shortly scabrid hairy, especially on the upper part. The majority of the flowers solitary to a bract, eventually a few of the lower ones in pairs. Upper bracts  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, the lower ones up to 1 in. or more, slightly hairy; the pedicels shorter than the bracts. Flowers about  $\frac{3}{4}$  in. across, the perianth segments white, without a median stripe, but sometimes bronze-tinged. Fruits up to about  $\frac{1}{4}$  in. long.

Turkana-Karamoja area.

A. uyuiense Rendle Fig. 7

Stocks contiguous, fibrous, forming a thick irregular rhizome, about  $\frac{1}{2}$  in. across; the roots stringy, sometimes with small distant potato-like tubers. Leaves 1 - 2 ft. long and  $\frac{1}{4}$  -  $\frac{1}{2}$  in. wide, narrowed in their lower half, hairless, the sheaths with irregular purple markings just above ground level. Peduncles up to 2 ft. long, flattened and narrowly winged, slightly zig-zag between the well spaced groups of 1 - 3 flowers. Bracts, except the lowermost, short, subequal to the pedicels, which are less than  $\frac{1}{4}$  in. long. Flowers  $\frac{3}{4}$  -  $1\frac{1}{4}$  ins. across, the perianth segments white, without a well developed median stripe. Fruits about  $\frac{1}{4}$  in. long, transversely wrinkled, little indented at the apex.

Western Kenya, particularly in the Elgon area.

A. venulosum Bak.

Underground parts not seen. Leaves up to 18 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., with hairy margins. Peduncles 15 - 30 ins. long, flattened and finely winged, the margins shortly hairy. Flowers laxly arranged in groups of 2 - 3. Bracts, except the lowest, small, less than  $\frac{1}{4}$  in.



long; the pedicels subequal. Flowers 1 -  $1\frac{1}{4}$  ins. across, the perianth segments white with a conspicuous red-brown stripe. Fruits up to  $\frac{1}{4}$  in. long, transversely wrinkled, little indented at the apex.

Southern Province, not common; more material desirable.

A. zanguebaricum Bak.

Stocks fibrous, with short connecting rhizomes; the roots stringy, some with small potato-like tubers. Leaves narrow,  $18 \times \frac{1}{4}$  -  $\frac{1}{3}$  in. narrowed in their lower part, hairless. Inflorescences usually 12 - 18 ins. tall, the flowers usually rather crowded towards the top, occasionally with short lateral branches; the peduncles flattened and slightly winged, at least in their upper part. Flowers mostly in groups of 2 - 3. Bracts short  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long; the pedicels also short, up to  $\frac{1}{3}$  in. long. Flowers up to 1 in. across, the perianth segments white to pale green (?), without a median stripe. Fruits about  $\frac{1}{4}$  in. long, little indented at the apex.

Coastal.

A. zavattarii Cuf.

Roots tapering from thickened bases,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. across; the stocks fibrous. Leaves broad, 4 - 8 x 1 - 2 ins., markedly narrowed in their lower part, hairless. Peduncles 12 - 18 ins. long, with many well developed branches, these usually branching again, bearing many well spaced flowers, often in pairs. Pedicels  $\frac{1}{2}$  -  $1\frac{1}{2}$  ins. long. Flowers greenish to white, very variable in size, ( $\frac{1}{8}$  -)  $\frac{1}{4}$  -  $\frac{1}{2}$  (-  $\frac{5}{8}$ ) in. long; opening only in the afternoon.

Northern Frontier Province.

BOWIEA Harv.

B. volubilis Harv. Fig. 8

Climber with a large bulb up to 6 ins. across, producing one to two strap-shaped leaves up to 3 ins. long and slender much branched green stems, with narrow, fleshy, ultimate branchlets. Stem leaves inconspicuous, scale-like. Flowers solitary on pedicels 1 - 2 ins. long; the perianth segments narrow, greenish, with small attached stamens, around the conic ovary. Fruits bluntly three-angled and long-pointed ellipsoid, eventually up to  $1 \times \frac{3}{8}$  in., the seeds flattened and elongate.

Dry places in most parts of Kenya, below 8,000 ft.

BULBINE Linn.

Flowers yellow; the fruits up to  $\frac{3}{8}$  in. long..... B. abyssinica

Flowers whitish, the perianth segments with a vague green stripe; the fruits inflated, about  $\frac{1}{4}$  in. long..... B. fistulosa

B. abyssinica A. Rich. Fig. 9

Shortly rhizomatous with small fibrous stocks; the roots fleshy. Leaves narrow, often inrolled, up to 1 ft. long. Peduncles 8 - 18 ins. long, with rather a dense head of flowers. Bracts  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long; the pedicels  $\frac{1}{2}$  - 1 in. long. Flowers yellow,  $\frac{3}{8}$  -  $\frac{5}{8}$  in. across; the filaments densely bearded. Fruits globose, shrouded by a persistent and pointed cap of dried-out perianth segments, about

## Perennial Lilies

3/8 in. long.

Very common throughout the highlands, Masai and Machakos Districts, Northern Frontier Province.

Until recently, usually confused with the South African species, B. asphodeloides (L.) Spreng.

B. fistulosa Chiov.

Stocks small, less than 1/2 in. across with fleshy roots; the old leaf bases papery. Leaves narrow, cylindrical, up to 15 ins. long. Peduncles short, about 6 ins. long, the flowers rather crowded towards the top. Bracts 1/4 - 5/8 in. long; the pedicels short in flower, up to 1 in. long in fruit. Flowers small, the perianth segments whitish, with a vague green stripe; the filaments with conspicuous yellow hairs. Fruits much inflated, up to 3/4 in. long and nearly as wide, three-angled, each cavity with a single seed.

Rare, Northern Frontier Province.

## CHLOROPHYTUM Ker.

- 1a. Inflorescences spike-like; the pedicels less than 1/16 in. long; the flowers small, bell-shaped, less than 1/4 in. long.....2
- 1b. Inflorescences not spike-like, or if so, then the pedicels 1/4 in. long or more and the flowers not bell-shaped, the segments more than 1/2 in. long.....3
- 2a. Peduncles shortly scabrid hairy on their upper part.....C. bakeri
- 2b. Peduncles hairless.....C. sp. near bakeri
- 3a. Inflorescences prostrate on the ground, branched from near the base, about 6 - 10 ins. long, with well spaced flowers, single or in pairs..... C. humifusum
- 3b. Inflorescences erect.....4
- 4a. Large showy white flowers, with perianth segments 1/2 - 1 in. long.....5
- 4b. Perianth segments less than 1/2 in. long, yellowish, green or white, sometimes with a median stripe.....7
- 5a. Perianth segments narrow, not overlapping; the bracts well developed, often 1 in. long, soon dying off blackish; the flowers crowded; the roots swollen, but without well developed tubers.....C. sp. near macrophyllum
- 5b. Perianth segments ovate, overlapping, or if narrow, then the inflorescences lax and the bracts inconspicuous; the roots with many well developed tubers.....6
- 6a. Flowers laxly arranged, with minute bracts; the perianth segments narrow, reflexed in the young flowers..... C. tenuifolium
- 6b. Flowers crowded, the inflorescences sometimes branched; the bracts up to 1/2 in. long; the flowers cup-shaped with ovate, overlapping perianth segments..... C. tuberosum
- 7a. Medium sized plants. 9 - 15 ins. tall; the mature inflorescences with well developed branches, subtended by long bracts 3/4 - 2 ins. long, even on the young inflorescences the bracts of the incipient branches are usually longer than the others, which are 1/8 - 1/4 in. long; the perianth segments greenish, about 3/16 in. long; the fruits also about 3/16 in. long..... C. ukambense

- 7b. Either large plants 2 - 4 ft. tall with well developed branches to the inflorescences or smaller plants, usually with poorly developed branches on the inflorescences; the bracts, flowers and fruits not as above.....8
- 8a. Inflorescences usually 2-4 ft. tall with well developed branches, the lower ones often nearly as long as the continuation of the peduncle, subtended by large bracts; the small flowers laxly arranged in groups of 2-7..... 9
- 8b. Inflorescences unbranched, or with only one or two at the most, either short or if longer the plants rarely more than 1 ft. tall.....11
- 9a. Perianth segments  $\frac{1}{2}$  -  $\frac{5}{8}$  in. long; the fruits  $\frac{3}{8}$  -  $\frac{1}{2}$  in. long; robust plants, often flowering before the leaves appear..... C. andongense
- 9b. Perianth segments  $\frac{1}{8}$  -  $\frac{1}{2}$  in. long; the fruits less than  $\frac{3}{8}$  in. long.....10
- 10a. Perianth segments white with a brown median stripe,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long; the fruits  $\frac{1}{6}$  -  $\frac{1}{4}$  in. long; the peduncles slender without or with only one or two sheathing bracts below the branches of the inflorescence; the stocks not markedly fibrous..... C. gallabatense
- 10b. Perianth segments yellow to green,  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long; the fruits about  $\frac{1}{4}$  in. long; the peduncles robust, usually with several sheathing bracts below the branches of the inflorescence; the stocks markedly fibrous..... C. viridescens
- 11a. Leaves with hairy margins,  $\frac{2}{3}$  - 1 in. wide, the lower half narrowed and sheathing the peduncle, often purple tinged; the inflorescences up to 1 ft. tall, with short branches and crowded flowers ..... C. blepharophyllum
- 11b. Leaves hairless or if hairy not narrowed in their lower half and less than  $\frac{1}{2}$  in. wide; the inflorescences lax.....12
- 12a. Bracts subtending each group of flowers conspicuous, sheathing, about  $\frac{1}{2}$  in. long; the pedicels shorter than the bracts; the leaves narrowed conspicuously in their lower half; plants of forests and forest edges.....13
- 12b. Bracts subtending each group of flowers not conspicuous, less than  $\frac{3}{8}$  in. long; the leaves various.....14
- 13a. Leaves markedly narrowed for about half their length (subpetiolate); the pedicels articulated in their lower half..... C. sparsiflorum
- 13b. Leaves gradually narrowed downwards; the pedicels articulated in their upper half..... C. limurense
- 14a. Leaves flaccid, narrow, broadest in their upper half; the inflorescences tenuous, branched from near the base; the stocks very narrow, about  $\frac{1}{4}$  in. across, with only a few fibres; coastal forests..... C. sp. near laxum
- 14b. Leaves membranous, broadest at their base; the inflorescences not remarkably slender, sometimes with one or two branches; the stocks usually about  $\frac{1}{2}$  in. across, with a conspicuous crown of fibres; highlands.....15
- 15a. Roots fleshy, shortly furry when dried out, with small tubers less than  $\frac{1}{2}$  in. long; the leaves hairless; the flowers single or in pairs; the perianth segments without a median stripe..... C. micranthum
- 15b. Roots stringy, with distant potato-like tubers; the leaves with shortly hairy margins; the flowers 2 - 3 together; the perianth segments with a brown median stripe..... C. tordense



C. andongense Bak.

Often flowering before the leaves appear; the rhizomes with long swollen roots, finely furry when dried out. Leaves, when mature, 12 - 30 x 1 - 2 ins., narrowed in their lower half, hairless. Inflorescences  $1\frac{1}{2}$  -  $3\frac{1}{2}$  ft. tall, with a number of branches, the lower ones often about as long as the main axis. Flowers in groups of 3 - 8, lax or crowded. Bracts, except at the base of the branches, short, about  $\frac{1}{4}$  in. long; the pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long in flower, sometimes up to 1 in. in fruit, jointed at the middle or a little below. Flowers with narrow perianth segments,  $\frac{1}{3}$  -  $\frac{5}{8}$  in. long, greenish to white, with a dark green median stripe. Fruits oblong  $\frac{3}{8}$  -  $\frac{1}{2}$  in. long, conspicuously winged, not deeply indented at the apex.

Elgon area.

C. bakeri Poelln.

Rhizomes made up of small, shortly fibrous, contiguous stocks, less than  $\frac{1}{2}$  in. across; the roots swollen and fleshy, shortly furry when dried out. Leaves narrow, 6 - 15 x  $\frac{1}{4}$  -  $\frac{1}{2}$  in., hairless. Inflorescences subspicate, with the odd, short, lateral branch; peduncles from a few inches to more than 1 ft. tall, the upper part shortly scabrid. Flowers crowded, with the bracts often projecting beyond them and  $\frac{1}{8}$  -  $\frac{3}{8}$  in. long; the pedicels very short, less than  $\frac{1}{16}$  in. long. Flowers white, bell-shaped, the perianth segments  $\frac{1}{8}$  -  $\frac{3}{16}$  in. long; the stamens of the mature flowers conspicuously exerted. Fruits broader than long, about  $\frac{1}{8}$  in. long, winged and deeply indented at the apex.

Machakos District, and east to Voi, Northern Frontier Province and west to the Turkana District.

C. blepharophyllum Schweinf. ex Bak.

Shortly rhizomatous; the stocks with many narrow roots, bearing distant elongate tubers. Leaves (2-)4 - 10 x  $\frac{2}{3}$  - 1 in., narrowed in their lower half and clasping the peduncle, the sheaths and veins of the young leaves purple tinged, the margins hairy. Inflorescences (3-)6 - 12 ins. tall, usually with one or two short branches and many crowded flowers in groups of 2 - 4. Bracts relatively long,  $\frac{1}{4}$  -  $\frac{1}{2}$  (-  $\frac{3}{4}$ ) in. long; the pedicels short,  $\frac{3}{16}$  -  $\frac{5}{16}$  in. long. Flowers about  $\frac{3}{8}$  in. across, the perianth segments  $\frac{1}{4}$  -  $\frac{1}{3}$  in. long, white with a green median stripe. Fruits oblong  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, conspicuously three-winged; the perianth segments rather persistent.

Elgon and Teita Districts.

C. gallabatense Schweinf. ex Bak. Fig. 10

Rhizomes short, thick and fibrous, with many long, fleshy roots, finely furry when dried out, sometimes with small tubers. Leaves membranous, up to 18 ins. long and  $\frac{1}{2}$  - 1 in. wide, hairless. Inflorescences from 8 ins. to 2 - 3 ft. tall, with a number of long branches. Flowers in well separated groups of usually 2 - 4, with very short bracts, less than  $\frac{1}{8}$  in. long, except at the base of the branches; the pedicels also short, less than  $\frac{1}{4}$  in. long. Flowers  $\frac{1}{3}$  -  $\frac{1}{2}$  in. across, the segments white with a green or brown median stripe. Fruits small  $\frac{1}{6}$  -  $\frac{1}{4}$  in. long, conspicuously winged and indented at the apex.

Turkana and Elgon areas.



C. humifusum Cuf.

Rhizomatous chain of small stocks,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. across, with stout comb-like fibres; the roots wiry with small tubers on their branches. Leaves up to 10 ins. long and nearly 1 in. wide, narrowed in their lower part, very shortly hairy along the margins. Inflorescences branched from near the base, lying flat on the ground, about 6 - 10 ins. long. Flowers well spaced, solitary or in pairs. Bracts vary from  $\frac{1}{8}$  -  $\frac{1}{2}$  in. long; the pedicels slender,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers about  $\frac{1}{3}$  in. across, the perianth segments white with a short green stripe towards their tips. Fruits not seen.

Rare, Northern Frontier Province.

C. limurense Rendle

Medium sized, fibrous stocks, about  $\frac{1}{2}$  in. across; the roots rather fleshy, about  $\frac{1}{8}$  in. thick, shortly furry when dried out, some with small potato-like tubers. Leaves widest in their upper part, up to 1 ft. long,  $\frac{1}{2}$  -  $\frac{3}{4}$  in. wide. Inflorescences 8 - 18 ins. tall, lax to rather dense, sometimes with one to several short branches. Flowers usually in groups of 2 - 4, the outer bracts of each group conspicuous, about  $\frac{1}{2}$  in. long, larger towards the base; the pedicels shorter than the bracts, jointed near the middle or above. Flowers uniformly greenish white, about  $\frac{1}{2}$  in. across. Fruits  $\frac{1}{4}$  -  $\frac{5}{16}$  in. long, nearly as broad, three winged and markedly indented at the apex.

Forest and forest edges, Nairobi and the highlands.

Perhaps only a form of C. sparsiflorum Bak.

C. macrophyllum Aschers.

No material seen, but from the literature is similar to C. sp. near macrophyllum, described below, but more robust, the leaves up to 2 ft. long, narrowed in their lower half, the inflorescences up to 18 ins. tall, the perianth segments only  $\frac{1}{3}$  in. long, allegedly with a brown median stripe.

Coastal.

C. micranthum Bak.

Stocks small, less than  $\frac{1}{2}$  in. across, contiguous, fibrous; the roots fleshy with small tubers. Leaves narrow, about  $6 \times \frac{1}{4}$  in., hairless. Peduncles slender, less than 1 ft. long, the inflorescences often with one or two well developed branches and well spaced flowers, usually in pairs, the buds often nodding. Bracts small, but variable,  $\frac{1}{16}$  -  $\frac{3}{8}$  in. long; the pedicels slender,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long. Flowers small, the perianth segments about  $\frac{1}{4}$  in. long, greenish to white with a narrow green median stripe. Fruits about  $\frac{1}{6}$  in. long, three-winged.

Elgon area.

C. sparsiflorum Bak.

Very similar to C. limurense, which is probably only a form of this species, but the leaves markedly narrowed for about half their length (subpetiolate), the pedicels articulated in their lower half, the lobes of the fruits more rounded at the top.

Teita and coastal forests.

C. sp. near bakeri Poelln. Fig. 11

As C. bakeri, but the flowering stalks quite hairless. Perhaps best considered as a variety of that species.

Machakos and Nairobi Districts, Rift Valley region.

C. sp. near laxum R. Br.

Small graceful plant; rhizomatous with small stocks; the roots slender and slightly swollen, shortly furry when dried out, bearing small ovoid tubers. Leaves slender, 6 - 15 ins. long and up to  $\frac{1}{4}$  in. wide, broadest in their upper part. Inflorescences tenuous, branched from near the base, 6 - 12 ins. tall, the flowers well spaced, solitary or in pairs. Bracts small,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long; the pedicels  $\frac{1}{8}$  -  $\frac{3}{8}$  in. long. Flowers white,  $\frac{1}{3}$  -  $\frac{1}{2}$  in. across. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long, broadest near the top, three-winged.

Coastal.

C. sp. near macrophyllum Aschers. Fig. 12

Rhizomatous with medium sized stocks, about  $\frac{3}{4}$  - 1 in. across; the roots fleshy, about  $\frac{1}{8}$  in. thick, finely furry when dried out, some with small ovoid tubers. Leaves broadly sword-shaped, 6 - 12 (-18) ins. long usually 1 - 2 ins. wide, narrowed only at their very base. Inflorescences up to 1 ft. tall, the greater part densely crowded with flowers, usually in groups of up to five, with a large outer bract up to 1 in. long, the lower ones longer, projecting beyond the flowers and dying off blackish. Pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers  $\frac{5}{8}$  - 1 in. across, the perianth segments narrow, white, fading slightly vinaceous at the margins. Fruits  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long, winged, indented at the apex, rather persistently shrouded by dead perianth segments.

Nairobi and Machakos Districts, and east towards the coast.

C. tenuifolium Bak. Fig. 13

Stocks medium sized,  $\frac{1}{2}$  - 1 in. across, densely fibrous; the roots thick, fleshy, usually with elliptic tubers. Leaves up to 15 x  $\frac{1}{2}$  -  $\frac{3}{4}$  in., hairless. Inflorescences up to 18 ins. tall, usually unbranched, the flowers well spaced, usually solitary, but rarely in pairs. Bracts very small, the majority not more than  $\frac{1}{12}$  in. long; the pedicels about  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long in flower. Flowers white, constricted just above the base, the perianth segments reflexed soon after the flower opens, spreading as it matures and eventually folding forward as it fades; closing at night. Segments narrow,  $\frac{1}{2}$  -  $\frac{3}{4}$  in. long; stamens three long and three short. Fruits oblong,  $\frac{5}{8}$  -  $\frac{7}{8}$  in. long, three-winged and conspicuously indented at the apex.

Nairobi, Masai District and east towards the coast, Northern Frontier Province.

C. tordense Chiov. Fig. 14

Rhizomes irregularly branched, the stocks small,  $\frac{1}{4}$  -  $\frac{1}{2}$  in. across, fibrous; the roots stringy, some with potato-like tubers. Leaves narrow, about 6 ins. long, rarely to 1 ft.,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. wide, the outer ones hairy along the margins and sometimes on the veins as well. In the Nairobi District, at least, the sheaths are usually characteristically marked above ground level, by a tongue of brown, followed by a parallel band of white, before the green. Inflorescences 6 - 12 ins. tall, sometimes with one or two branches, the peduncles often zig-zag between the well spaced flowers, which are in groups of 2 - 3. Bracts usually less than  $\frac{1}{8}$  in. long; the pedicels  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long. Flowers  $\frac{3}{8}$  -  $\frac{5}{8}$  in. across, the perianth segments narrow, white, fading slightly bronze, with a greenish brown median stripe. Fruits  $\frac{1}{4}$  -  $\frac{3}{8}$  in.

long, three-winged, only slightly indented at the apex.  
 Nairobi District to the Northern Frontier Province.

C. tuberosum Bak. Fig. 15

Rhizomes with rather small contiguous stocks, the fibres raffia-like; the roots fleshy, the majority bearing well developed elliptic tubers, a short way from their bases. Leaves broad, 6 - 18 x ( $\frac{1}{2}$  -  $\frac{3}{4}$  - 1 (-1 $\frac{1}{2}$ ) ins., not markedly narrowed in their lower part, rather sparse hairs along the margins. Inflorescences 6 - 15 ins. tall, usually unbranched, the large flowers usually rather densely arranged, often in pairs. Upper bracts  $\frac{1}{4}$  -  $\frac{1}{2}$  in. long, the lower ones longer; the pedicels short. Flowers white, cup-shaped, the perianth segments ovate, overlapping towards the base,  $\frac{5}{8}$  -  $\frac{3}{4}$  x  $\frac{1}{4}$  -  $\frac{3}{8}$  in., sweet scented, open throughout the day. Fruits oblong,  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long, three-winged, but not deeply indented at the apex.

Nairobi District, east towards the coast, Northern Frontier Province and west to Turkana District.

C. ukambense Bak.

Stocks small, about  $\frac{1}{2}$  in. across, more or less contiguous; the roots bootlace-like, slightly fleshy, some with small, distant tubers. Leaves sword-shaped, 6 - 12 x  $\frac{3}{4}$  - 2 ins., hairless. Inflorescences up to about 15 ins. tall, with usually several well developed branches and small flowers in well spaced groups of 2 - 3. Bracts narrow,  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long, those at the base of the branches much longer, lowermost up to 2 ins.; the pedicels very slender,  $\frac{1}{16}$  -  $\frac{1}{8}$  in. long. Flowers green, the perianth segments  $\frac{1}{6}$  -  $\frac{1}{4}$  in. long, reflexed when fully open in the afternoon. Fruits small, about  $\frac{3}{16}$  in. long, broader than long, three-winged and deeply indented at the apex.

Machakos District and Northern Frontier Province.

C. viridescens Engl.

Stocks about  $\frac{3}{4}$  in. across, with fine fibres, not very persistent; the roots swollen, ? tuberous, finely furry when dried out. Leaves sometimes appear only after the flowers, up to 18 x 2 ins., sheathing the lower part of the peduncle. Inflorescences 2 - 3 $\frac{1}{2}$  ft. tall, with a number of well developed branches and well spaced flowers in groups of 2 - 5. Bracts  $\frac{1}{8}$  -  $\frac{1}{4}$  in. long, those subtending the branches much larger, 1 - 3 ins. long and also scattered down the peduncle; the pedicels slender  $\frac{3}{8}$  -  $\frac{5}{8}$  in. long. Flowers yellow or green, the perianth segments about  $\frac{1}{4}$  -  $\frac{3}{8}$  in. long. Fruits about  $\frac{1}{4}$  in. long, winged, somewhat indented at the apex, the perianth segments rather persistent.

Coast and Northern Frontier Province.

DIPCADI Medic.

- 1a. Outer perianth segments little longer than the inner, inrolled only at the very tip, for less than  $\frac{1}{16}$  in.; sand and coral crags near the sea..... D. longifolium
- 1b. Outer perianth segments much longer than the inner, forming a distinct solid tail, more than  $\frac{1}{8}$  in. long.....2
- 2a. Mature leaves narrow, sometimes inrolled, less than  $\frac{3}{16}$  in. wide.....3
- 2b. Mature leaves  $\frac{1}{4}$  -  $\frac{5}{8}$  in. wide, not inrolled.....4



- 3a. Small graceful plants; leaves inrolled, less than 1/16 in. wide, about 1/8 in. wide when unrolled, rarely more than 10 ins. long; peduncles slender, less than 1/20 in. across, 4 - 9 ins. tall; inner lobes of the perianth conspicuously pointed..... D. arenarium
- 3b. Larger plants; mature leaves not inrolled, up to 3/16 in. wide and 1 ft. long; peduncles 1/8 in. or more across, up to 2 ft. tall; inner lobes of the perianth segments bluntly pointed, slightly hooded..... D. filifolium
- 4a. Inner perianth segments narrow, pointed; free part of the outer segments (1/2-) 5/8 - 1 in. long in mature, and up to 1 1/4 ins. long in old flowers; the tail at these stages (3/16-) 3/8 - 5/8, 7/8 in. long..... D. ?viride
- 4b. Inner lobes bluntly pointed to rounded, usually hooded; free part of the outer segments shorter, 3/8 - 5/8 in. long in mature and up to 1/4 in. long in old flowers; the tail at these stages (1/8-) 3/16 - 1/4, 3/8 in. long.....5
- 5a. Leaves distinctly hairy; the outer perianth segments with very short tails, about 1/8 - 3/16 in. long.....D. sp. cf. platyphyllum
- 5b. Leaves hairless; the outer perianth segments of the mature flowers with tails more than 3/16 in. long..... D. sp. near viride

D. arenarium Bak.

Bulbs 3/4 - 1 in. across, the outer sheaths papery. Leaves inrolled and very narrow, less than 1/16 in. wide and only about 1/8 in. wide when unrolled, rarely more than 10 ins. long. Peduncles very slender, 1/20 in. or less across, 4 - 9 ins. long, with a few well spaced flowers. Bracts 1/8 - 3/16 in. long; the pedicels 1/16 - 1/8 in. long in flower, up to 3/16 in. in fruit. Flowers yellowish brown to green, tube 1/10 - 1/8 in. long, the outer lobes free for about 1/2 in., the last 1/8 - 3/16 in. solid, tapering, tail-like, sometimes greatly extended, up to 3/4 in. long. Inner segments continued more or less joined together, 1/4 - 5/16 in., tips free and spreading for 1/12 - 1/8 in., narrow and conspicuously pointed. Anthers about 1/8 in. long. Fruits broadly conic, up to 3/8 in. long (? ripe).

Masai District, Rift Valley and Northern Frontier Province; not common.

D. filifolium Bak.

Bulbs about 1 in. across, the outer sheaths papery. Leaves few, up to 1 ft. long, rarely over 1/8 in. wide. Peduncles up to 2 ft. long, with a few well spaced flowers. Bracts short, about 1/4 in. long; the pedicels about the same length. Flowers green, the tube about 1/4 in. long, the outer lobes narrow, about 3/8 - 1/2 in. long, the tips solid, tail-like, 1/8 - 3/16 in. long. Inner segments continued more or less joined together 3/16 in., the tips free and spreading, 1/16 in. long, slightly hooded, bluntly pointed. Anthers 1/6 in. long. Fruits not seen.

Northern Frontier Province.

D. longifolium (Lindl.) Bak.

Bulbs about 1 in. across. Leaves narrow, 1 - 2 ft. x 1/8 - 3/8 in. Inflorescences 8 - 18 ins. tall, the flowers well spaced. Bracts from about 1/8 in. at the top to 1/2 in. long at the base; the pedicels (1/8-) 1/4 - 3/8 in. long. Flowers green, yellowish towards the tips, the tube 1/10 - 1/8 in. long, the outer lobes 3/8 - 1/2 in., eventually up to 5/8 in. long, scarcely tailed,



inrolled at the tip for less than  $1/16$  in. Inner segments continued  $3/8 - 7/16$  in., free in the lower part, joined where the filaments are inserted about  $3/16$  in. of the way up, the tips free and spreading, pointed,  $1/16 - 1/8$  in. long. Anthers about  $1/6$  in. long. Fruits  $1/2 - 5/8$  in. long, nearly as broad towards the top.

Coastal, sand and coral crags near the sea.

D. sp. cf. platyphyllum Bak.

Very similar to the more common D. sp. near viride, but the leaves distinctly hairy along the margins and the tails even of the mature outer lobes very short,  $1/8 - 3/16$  in. long.

Rare, Machakos District.

D. sp. near viride (Linn.) Moench. Fig. 17

Bulbs  $1 - 1\frac{1}{2}$  ins. across, the outer sheaths papery. Leaves from about 6 ins. to over 1 ft. long, usually  $3/8 - 5/8$  in. wide, sometimes less, hairless. Inflorescences sometimes only 6 ins., usually  $1 - 2 (-4)$  ft. tall, with a number of well spaced to rather crowded flowers. Bracts  $1/8 - 1/2 (-5/8)$  in. long; the pedicels  $1/16 - 3/8$  in. long. Flowers green, with khaki to yellowish lobes, the tube  $1/8 - 1/4 (-3/8)$  in. long, the outer lobes  $3/8 - 5/8 (-3/4)$  in. long, the tails  $3/16 - 1/4 (-3/8)$  in. long; the inner lobes more or less joined for a further  $1/4 - 3/8$  in., the tips free and spreading,  $1/12 - 1/8$  in. long, broad and very bluntly pointed, usually slightly hooded. Anthers  $1/8 - 1/6$  in. long. Fruits not seen.

Nairobi and Machakos Districts, Northern Frontier Province, west to Turkana and Karamoja.

D. ? viride (Linn.) Moench.

Bulbs  $1 - 1\frac{1}{2}$  ins. across, the outer sheaths papery. Leaves usually flaccid,  $6 - 12 \times \frac{1}{4} - \frac{1}{2}$  in., hairless. Inflorescences  $12 - 18$  ins. tall, occasionally branched, with a number of well spaced flowers. Bracts  $3/16$  in. long at the top to  $\frac{1}{2}$  in. long at the base; the pedicels  $1/16 - 1/4$  in. long. Flowers yellowish to green, the tube  $1/8 - 3/16$  in. long, the outer lobes  $\frac{1}{2}$  in. or a little less in young flowers, the majority  $5/8 - 1$  in., sometimes to  $1\frac{1}{4}$  ins. long, the tails very long and slender,  $(3/16 - ) 3/8 - 7/8$  in. long; the inner segments continued in a tube  $1/4 - 7/16$  in., the tips free and spreading,  $1/8$  in. long, usually not hooded, narrow, distinctly pointed. Anthers  $1/8 - 1/6$  in. long. Fruits up to  $3/8$  in. long.

Elgon area, Turkana District and Northern Frontier Province.

DRIMIA Jacq.

Inflorescences very congested, head-like,  $4 - 6$  ins. long;

bracts large, much exceeding the buds; the pedicels

about  $\frac{1}{4}$  in. long in flower..... D. congesta

Inflorescences longer, more lax, up to  $8$  ins. long; the

bracts not exceeding the buds; the pedicels  $\frac{1}{2} - \frac{3}{4}$  in. long..... D. elgonica

D. congesta Bullock

Bulbous, the leaves not usually fully developed until after flowering, up to  $8 \times \frac{1}{2}$  in., with whisker-like, hairy margins at

## Perennial Lilies

the flowering stage. Inflorescences to 3 ft. tall with the flowers congested into a short head at the top, about 4 - 6 ins. long. Bracts conspicuous, the lower ones up to 1 in. long; the pedicels  $1/8 - 5/16$  in. long in flower, up to  $1/2$  in. long in fruit. Flowers cream with mauve lines, the perianth segments joined into a short tube about  $1/8$  in. long, the lobes very narrow, broadened a little upwards,  $1/2 - 5/8$  in. long. Filaments tapered, inserted at the base of the perianth lobes,  $3/8 - 1/2$  in. long. Fruits about  $1/2$  in. long, shortly pointed at the apex.

Elgon, rare.

### D. elgonica Bullock

As above, the leaves and bulbs unknown, but the inflorescences longer and more lax, up to 8 ins. long. Bracts not exceeding the buds; the pedicels  $1/2 - 3/4$  in. long in flower. Flowers off-white, with a maroon throat, about the same size as those of D. congesta.

Elgon, rare.

## DRIMIOPSIS Lindl.

Leaves sword-like, erect, up to  $12 \times 1 - 1\frac{1}{2}$  ins., narrowed gradually in their lower half..... D. botryoides

Leaves ovate, in a rosette; about  $3 \times 1 - 4 \times 1\frac{1}{4}$  ins., rounded into a short petiole-like base..... D. sp.

### D. botryoides Bak.

Large bulbs, up to 3 ins. across. Leaves sword-like, up to nearly 1 ft. long and  $1 - 1\frac{1}{2}$  ins. wide, narrowed in their lower half, mottled dark green, hairless or rarely with short hairs along the margins. Inflorescences 6 - 15 ins. tall, the flowers rather crowded towards the top. Bracts not apparent; the pedicels about  $1/16$  in. long. Flowers greenish white, becoming yellowish, the segments joined into a tube for about  $1/4$  of their length. Filaments  $1/16$  in. long, attenuate triangular, inserted at the top of the perianth tube, the bases contiguous, but not joined into a tube. Fruits about  $3/16$  in. long, three-lobed.

Coastal and Northern Frontier Province.

### D. sp.

Bulbous, the leaves ovate in a rosette, spotted with purple,  $3 \times 1 - 4 \times 1\frac{3}{4}$  ins., rounded into a very short, narrow, petiole-like base. Inflorescences 4 - 8 ins. tall, with a number of rather small flowers. Bracts not apparent; the pedicels about  $1/16$  in. long. Flowers small; white, cup-shaped, about  $1/8 - 3/16$  in. long, the segments joined into a tube for about  $1/4$  of their length, the lobes broad. Filaments apparently joined into a very short tube at their base, inserted at the top of the perianth tube, attenuate triangular,  $1/10$  in. long; the anthers short.

Mt. Kenya area, rare.

## ERIOSPERMUM Jacq.

Leaves bluish green, stiffly erect, leathery, up to  $8 \times 3/8 - 5/8$  in., the lower half very much narrowed, petiole-like, less than  $1/8$  in. wide; the pedicels  $1 - 2\frac{1}{2}$  ins. long..... E. abyssinicum

Leaves green, slightly narrowed towards the base, not at all petiole-like; the pedicels less than 1 in. long..... E. triphyllum

E. abyssinicum Bak.

Tubers depressed globose, 1 - 1½ ins. across, very fibrous. Leaves bluey green, leathery, up to 8 x 3/8 - 5/8 in., their lower half very much narrowed, petiole-like. Peduncles up to 1 ft. long, usually rather zig-zag, with a number of well spaced flowers. Bracts very short, about 1/16 in. long; the pedicels long, 1 - 2½ ins. Flowers small, yellow, with oblong segments, 1/4 - 3/8 in. long, very shortly joined at the base. Filaments narrow, inserted on the lobes a little above the tube, 1/8 - 3/16 in. long. Fruits with rounded lobes and hairy seeds.

Elgon area and Northern Frontier Province.

E. triphyllum Bak. Fig. 16

Tubers discoid to subglobose, red when cut, fibrous. Leaves up to 6 ins. long, usually narrow, 1/8 - 1/4 in. wide, sometimes up to ¾ in., narrowed gradually only towards the base. Inflorescences 4 - 8 ins. tall, with a number of well spaced flowers. Bracts very short, less than 1/16 in. long; the pedicels slender, ½ - ¾ in. long. Flowers yellow inside, reddish brown without, 3/16 - 1/4 in. long, the perianth segments oblong, joined at the very base. Filaments narrow, 1/8 in. long, inserted on the lobes at the top of the tube. Fruits red tinged, with rounded lobes, 3/16 - 1/4 in. long; the seeds with long white hairs.

Coast to Nairobi, Northern Frontier Province, and Elgon area.

? var. A much more robust plant, with larger leaves and longer, stout pedicels, up to 1 in. long, has been collected from Karamoja and the Northern Frontier Province. This may even prove to be a distinct species.

GLORIOSA Linn.

Small plants, rarely more than 1 ft. tall; the perianth segments 1½ - 2 x ¼ in.; the leaves always narrow, 1/8 - 5/16 (- ½) in. wide, recurved; the tendrils short or inconspicuous..... G. minor

Larger plants, often 2 ft. or more tall; the perianth segments if less than ½ in. wide, over 2 ins. long; the leaves occasionally narrow, but usually more than ½ in. wide, spreading; the tendrils usually conspicuous..... G. virescens

G. minor Rendle

Small plants, 6 - 12 ins. tall, with narrow, often recurved leaves, crowded on the upper part of the stem, the lowest opposite, the upper ones alternate; towards the stem apex the internodes are long again with one to three flowers. Leaves 2½ - 4 x 1/8 - 5/16 in., the lower ones up to ½ in. wide, only slightly and gradually tapered to the base, attenuate to the tip, which may be continued as a short tendril, 1/8 - 1/4 in. long. Peduncles 1½ - 2½ ins. long, curved in their upper part. Perianth segments scarlet or yellow at the base, shading to scarlet at the top, the segments 1½ - 2 ins. long, entire, infolded near the base. Stamens (½-) 5/8 - 3/4 in. long; the anthers about 3/16 in. long. Style at right angles to the ovary, about ¾ in. long, shortly three-branched,



the branches 1/20 - 1/10 in. long.

Dry, usually sandy places, coast and Northern Frontier Province.

G. virescens Lindl.

Erect plants to 3 ft. tall, sometimes much more, the leaves opposite below, alternate above, the internodes longer with several flowers towards the top. Leaves up to 5 ins. long, broadest in their lower half,  $\frac{1}{2}$  -  $1\frac{1}{2}$  ins. wide, rounded at the base, attenuate into a long tendril,  $\frac{3}{4}$  -  $1\frac{1}{2}$  ins. long, at the apex. Pedicels 2 - 4 ins. long, recurved towards the top. Flowers yellow or yellow and scarlet to dark red, the perianth segments  $1\frac{3}{4}$  -  $2\frac{1}{2}$  ins. long, broadest above the middle, the apex pointed, waisted below, with the sides infolded. Filaments about  $\frac{3}{4}$  in. long, the anthers  $3/8$ - $1/2$  in. long. Style at right angles to the ovary  $\frac{3}{4}$  -  $1\frac{1}{2}$  ins. long, three-branched, the branches  $1/8$  -  $3/8$  in. long.

Widespread below 8,000 ft.

This is a very variable complex, possibly of several hybridising species. Certain local forms are rather distinctive e.g. one from Voi area and parts of the Northern Frontier Province has almost pure yellow flowers and very variable leaves; another from western Kenya not infrequently has pure yellow flowers and very broad leaves, the lower ones  $1\frac{1}{2}$  - 2 ins. wide; in forests of, for example the Molo area, it is reported as climbing to 15 ft. The most widespread form, found in the Nairobi District for instance, is 2 - 3 ft. tall, with medium sized flowers and leaves, the perianth segments typically red with yellow towards the base.

KNIPHOFIA Moench.

(Red-hot Pokers)

- 1a. Flowers shortly hairy outside..... K. snowdeni
- 1b. Flowers hairless.....2
- 2a. Bracts  $1/8$  -  $1/4$  (-  $3/8$ ) in. long..... K. rogersii
- 2b. Bracts  $1/4$  -  $1/2$  in. long..... K. thomsoni

K. rogersii E.A. Bruce Fig. 18

Mass of irregular, branched rhizomes. Leaves up to 2 ft. x 1 in. Inflorescences 18 - 30 ins. tall, with a rather dense head of flowers. Bracts short, up to  $3/8$  in. long; the pedicels also short, recurved. Flowers elongate, trumpet-shaped, up to 1 in. long, pendant, yellow to flame red, swollen at the base, the free lobes short, about  $1/10$  in. long, spreading. Fruits pointed ovoid, about  $3/8$  in. long.

Marshy places, Aberdares, Mau and Elgon.

Almost certainly no more than a variety of K. thomsoni, if that.

K. snowdeni C.H. Wright

Rhizomatous, leaves up to 3 ft. long, narrow,  $1/4$  -  $3/8$  in. wide. Inflorescences usually 18 ins. to 3 ft. tall, sometimes more, the flowers densely to rather laxly arranged towards the top. Bracts  $1/8$  -  $1/4$  in. long; the pedicels less than  $1/8$  in. long. Flowers elongate trumpet-shaped, a little swollen at the base, orange-red, shortly hairy, the mature flowers 1 -  $1\frac{1}{4}$  in. long, the triangular

lobes short, about 1/10 in. long. Fruits subglobose to ovoid, about 1/4 in. long.

Marshy places, Elgon area and south to Londiani.

K. thomsoni Bak.

Very similar to K. rogersii, but the bracts 1/4 - 1/2 in. long, the mature inflorescences often rather lax.

Teita Hills and Mt. Kenya.

Intermediates with K. rogersii, which at the most might be considered as a variety, occur on the Aberdares.

ORNITHOGALUM Linn.

- 1a. Very small plants, usually only a few inches tall, with thread-like leaves and peduncles; a few small white flowers..... O. gracillimum
- 1b. Robust plants, 1 - 4 ft. tall; the leaves strap-shaped, more than 1/4 in. wide; peduncles stout with many flowers.....2
- 2a. Pedicels 3/4 - 1 1/2 in. long in flower, up to 2 1/2 in. in fruit; the perianth segments 5/8 - 3/4 (- 7/8) in. long. O.sp.(=Albuca donaldsoni)
- 2b. Pedicels less than 1/2 in. long; the perianth segments less than 3/4 in. long.....3
- 3a. Pedicels 1/4 - 1/2 in. long; the bracts 1/2 - 1 in. long in flower, up to 2 ins. long in fruit; the perianth segments 1/4 - 3/8 in. long..... O. longibracteatum
- 3b. Pedicels 1/16 - 1/8 (-3/16) in. long; the bracts 1/8 - 1/2 in. long; the perianth segments 3/16 - 1/4 in. long..... O. ecklonii

O. ecklonii Schlecht.

Bulbs 1 - 3 ins. across; the leaves from 6 ins. to over 2 ft. long, 1/4 - 1/2 in. wide. Inflorescences 18 - 30 ins. tall, the flowers crowded towards the top, becoming more lax with age. Bracts (1/8-) 1/4 - 1/2 in. long, projecting beyond the buds; the pedicels 1/16 - 1/8 (-3/16) in. long. Perianth segments green, margined with white, 3/16 - 1/4 in. long. Filaments broad, sharply narrowed in their upper half, about 3/16 in. long. Fruits pointed ovoid, about 1/4 in. long.

Elgon area.

O. gracillimum R.E. Fries Fig. 19

Bulbs small, 1/4 - 3/8 in. across; a graceful little plant with very narrow thread-like leaves, 2 - 6 ins. long. Peduncles wiry, 2 - 5 (-8) ins. long; with a few, laxly arranged flowers. Bracts about 1/8 in. long; the pedicels (1/4-) 1/2 - 1 (-1 1/2) ins. long, spreading. Flowers white, about 1/4 in. across, the perianth segments oblong, the outer ones shortly hooded. Filaments, more particularly the inner ones, broadened. Fruits three-lobed, about 3/16 in. long.

Throughout the highlands, below about 10,000 ft.

O. longibracteatum Jacq. Fig. 20

Bulbs 2 - 3 ins. across; the leaves up to 2 - 3 ft. x 1/2 - 1 in. Inflorescences 2 - 4 ft. tall, with a long, sometimes rather dense head. Bracts conspicuous, 1/2 - 1 in. long, usually projecting beyond the flowers; the pedicels 1/4 - 1/2 in. long. Flowers medium

sized, cup-shaped, the perianth segments broadly oblong, green with white margins,  $1/4 - 3/8$  in. long. Filaments, especially the inner ones, broad, tapering sharply near the apex,  $3/16 - 1/4$  in. long. Fruits ovoid, bluntly pointed,  $3/8 - 1/2$  in. long.

Grassland and rocky places, Nairobi, Machakos and Masai District, north to Mt. Kenya area and Rift Valley.

O. sp. (= *Albuca donaldsoni* Rendle)\*

Large bulbs, about 3 ins. across; the leaves up to 2 ft. x  $1 - 1\frac{1}{2}$  ins., hairless. Inflorescences 15 - 30 ins. tall, with many rather crowded flowers on the upper part. Bracts  $\frac{3}{4} - 2 (-2\frac{1}{2})$  ins. long; the pedicels spreading,  $\frac{3}{4} - 1\frac{1}{2}$  ins. long in flower, up to  $2\frac{1}{2}$  ins. in fruit. Flowers white to cream, the outer segments green striped, the segments oblong,  $5/8 - 3/4 (-7/8)$  in. long. Filaments broad, gradually tapered,  $5/16 - 3/8$  in. long; the anthers about  $1/8$  in. long. Fruits  $1/2 - 5/8$  in. long, nearly as broad towards the top.

Dry country, Northern Frontier Province and south to Voi.

SCILLA Linn.

- 1a. Robust plants; the flowers  $5/16 - 7/16$  in. long; the pedicels  $3/16 - \frac{1}{2}$  in. long; the leaves ovate or sword-shaped, 5 - 12 ins. long, 2 -  $3\frac{1}{2}$  ins. wide..... *S. kirkii*
- 1b. Smaller plants; the flowers less than  $\frac{1}{4}$  in. long; the pedicels not more than  $3/16$  in. long; the leaves usually less than 5 ins. long, less than 1 in. wide.....2
- 2a. Flowers  $3/16 - \frac{1}{4}$  in. long; the leaves sometimes long and narrow, only  $\frac{1}{4}$  in. wide, but usually 3 - 5 x  $5/8 - 1$  in..... *S. indica*
- 2b. Flowers  $1/8 - 3/16$  in. long; the leaves very narrow, usually less than  $1/6$  in. wide..... *S. edulis*

*S. edulis* Engl.

Small bulbs,  $\frac{1}{2} - 1$  in. across. Leaves up to 6 ins. long, narrow, broadest in their upper part, up to  $1/6$  in. wide, sometimes hairy on the lower part. Peduncles slender, 3 - 8 ins. long, sometimes hairy towards the base, a number of flowers towards the top. Bracts minute; the pedicels pale purple, about  $1/6$  in. long. Flowers reddish purple,  $1/8 - 3/16$  in. long, the perianth segments oblong, joined into a tube at the very base. Filaments narrow, attached towards the base of the segments and a little shorter than them. Fruits about  $1/6$  in. long, three-lobed, the lobes rounded at the top.

Coastal and Karamoja.

*S. indica* Bak. Fig. 21

More robust than the above; bulbs 1 - 2 ins. across. Leaves broadened above, usually 3 - 5 x  $5/8 - 1$  in., occasionally long and narrow, only  $\frac{1}{4}$  in. wide, usually with purple or dark green splotches. Inflorescences 4 - 9 ins. tall, the flowers rather crowded on the upper part. Bracts small,  $1/20 - 1/12$  in. long;

\* see footnote p.5



the pedicels  $1/16 - 3/16$  in. long. Flowers purplish,  $3/16 - 1/4$  in. long, bell-shaped, swollen at the base, the segments oblong, often reflexed, joined into a tube at the very base. Stamens as above. Fruits about  $3/16$  in. long with rounded lobes, which are usually single seeded.

Throughout the highlands.

S. kirkii Bak.

Robust plants with large bulbs 2 - 3 ins. across. Leaves ovate to sword-shaped, purple splotched,  $5 \times 2\frac{1}{2} - 12 \times 2 - 3\frac{1}{2}$  ins., hairless. Inflorescences about 8 - 18 ins. tall, with many flowers. Bracts small, up to  $1/16$  in. long; the pedicels lilac,  $3/16 - 1/2$  in. long. Flowers greenish, tinged purple, especially outside,  $5/16 - 7/16$  in. long, the segments joined at the very base, reflexed when mature. Filaments purple, attached to the perianth segments a little above the tube, about  $3/16$  in. long. Fruits with three, rounded lobes, which are usually single seeded.

Nairobi and Masai Districts, east to the coast, Northern Frontier Province.

URGINEA Steinh.

- 1a. Flowers  $5/8 - \frac{3}{4}$  in. long; the fruits about  $\frac{3}{4}$  in. long..... U. ?zambesiaca
- 1b. Flowers  $3/8$  in. long or less; the fruits less than  $\frac{1}{2}$  in. long.....2
- 2a. Robust plants, 2 - 6 ft. tall, with many flowers..... U. altissima
- 2b. Smaller plants, 8 - 18 ins. tall, with rather few flowers.. .... U. indica

U. altissima (Linn. f.) Bak.

Large bulbs, about 4 ins. across, often partially exposed above the ground; the torn leaf bases cotton-wool-like. Leaves usually appear after the flowers, strap-shaped, up to  $18 \times 1 - 1\frac{1}{2}$  ins. Inflorescences 2 - 6 ft. tall, with many flowers. Bracts very small, less than  $1/10$  in. long; the pedicels stiffly spreading,  $\frac{1}{2} - \frac{3}{4}$  in. long in flower and up to 1 in. in fruit. Perianth segments whitish, with a broad green median stripe, oblong,  $1/4 - 5/16$  in. long, shortly joined at the base. Filaments inserted at the top of the tube, about  $1/8 - 3/16$  in. long, tapering from only a slightly broadened base. Fruits up to  $3/8$  in. long, winged; the black seeds surrounded by a conspicuous membranous wing,  $1/8 - 3/16$  in. long.

All parts of Kenya, below about 8,000 ft.

U. indica Kunth Fig. 22

Bulbs up to 2 ins. across. Leaves often appear after the flowers, strap-shaped, up to  $8 \times 3/8$  in. Inflorescences 8 - 18 ins. tall, with rather few flowers. Bracts very small; the pedicels  $\frac{1}{2} - 1$  in. long in flower, up to  $1\frac{1}{4}$  in. in fruit. Perianth segments greenish brown, usually with a whitish margin, shortly joined at the base. Filaments fine,  $1/8 - 3/16$  in. long, inserted at the top of the perianth tube. Fruits  $3/8 - 7/16$  in. long, not markedly winged; the seeds black, winged,  $1/4 - 3/8$  in. long.

Machakos District and Northern Frontier Province.

## Perennial Lilies

### U. ?zambesiaca Bak.

Bulbs up to 3 ins. across. Leaves usually appear after the flowers, narrow up to 12 x 3/8 in. Inflorescences 1½ - 2 ft. tall, with a number of well spaced flowers. Bracts up to 3/16 in. long, soon falling; the pedicels very long, 1 - 1½ ins. long in flower, up to 2 ins. in fruit. Perianth segments green with a brown stripe, 5/8 - 3/4 in. long, shortly joined at the base. Filaments inserted at the top of the perianth tube, about ½ in. long, broadened in their lower half. Fruits ¾ in. or so long, nearly as broad, winged; the seeds flat and winged.

Coastal.

### WURMBEA Thunb.

### W. tenuis (Hook. f.) Bak. Fig. 23

Small plants with bulb-like corms, 1/4 - 3/8 in. across. Leaves narrow, thickened, up to 5 x ½ in., the upper leaves small, sheathing the peduncle, which is 1 - 6 ins. long, with a few sessile flowers towards the top. Bracts not apparent. Flowers 3/8 - 1/2 in. across, the perianth segments white, with two contiguous purple spots towards the base of each segment; the filaments attached just below these. Ovary elongate with three short, persistent styles. Fruits up to ½ in. long.

Highlands, above 7,000 ft.

## INDEX

<u>Albuca</u> .....	4	<u>A. zanguebaricum</u> .....	9
<u>A. blepharophylla</u> .....	4	<u>A. zavattarii</u> .....	9
<u>A. pachychlamys</u> .....	4	<u>Asparaqus</u> .....	1
<u>A. wakefieldii</u> .....	4		
<u>Aloe</u> .....	1	<u>Bowiea</u> .....	9
<u>Androcymbium</u> .....	4	<u>B. kilimandscharica</u>	
<u>A. melanthioides</u>		= <u>B. volubilis</u> .....	9
var. <u>striatum</u> .....	4	<u>B. volubilis</u> .....	9
<u>Anthericum</u> .....	5	<u>Bulbine</u> .....	9
<u>A. angustifolium</u> .....	6	<u>B. abyssinica</u> .....	9
<u>A. gregorianum</u> .....	6	<u>B. asphodeloides</u> .....	10
<u>A. kassneri</u> .....	6	<u>B. fistulosa</u> .....	10
<u>A. oatesii</u> .....	7		
<u>A. pterocaulon</u> .....	7	<u>Chlorophytum</u> .....	10
<u>A. rubellum</u>		<u>C. andongense</u> .....	12
= <u>A. zanguebaricum</u> .....	9	<u>C. bakeri</u> .....	12
<u>A. sp.</u>		<u>C. blepharophyllum</u> .....	12
= <u>Chlorophytum moniliiforme</u> ....	7	<u>C. ciliatum</u>	
<u>A. sp. near pterocaulon 1</u> .....	7	= <u>C. blepharophyllum</u> .....	12
<u>A. sp. near pterocaulon 2</u> .....	7	<u>C. gallabatense</u> .....	12
<u>A. speciosum</u> = <u>A. uyuiense</u> .....	8	<u>C. humifusum</u> .....	13
<u>A. subpappilosum</u> .....	8	<u>C. limurense</u> .....	13
<u>A. subpetiolatum</u> .....	7	<u>C. macrophyllum</u> .....	13
<u>A. suffruticosum</u> .....	8	<u>C. micranthum</u> .....	13
<u>A. taylorianum</u> .....	8	<u>C. sparsiflorum</u> .....	13
<u>A. uyuiense</u> .....	8	<u>C. sp. near bakeri</u> .....	13
<u>A. venulosum</u> .....	8	<u>C. sp. near laxum</u> .....	14

C. sp. near macrophyllum.....14	<u>Kniphofia</u> .....20
C. tenuifolium.....14	K. rogersii.....20
C. tordense.....14	K. snowdeni.....20
C. tuberosum.....15	K. thomsoni.....21
C. ukambense.....15	
C. viridescens.....15	<u>Ornithogalum</u> .....21
	O. caudatum
<u>Dasystachys</u> = Chlorophytum.....12	= O. longibracteatum.....21
D. debilis	O. ecklonii.....21
= Chlorophytum bakeri.....12	O. gracillimum.....21
D. gracilis	O. longibracteatum.....21
= Chlorophytum bakeri.....12	O. sordidum = O. ecklonii...21
<u>Dipcadi</u> .....15	O. sp.
D. arenarium.....16	= <u>Albuca donaldsoni</u> .....22
D. filifolium.....16	
D. longifolium.....16	<u>Scilla</u> .....22
D. sp. cf. platyphyllum.....17	S. edulis.....22
D. sp. near viride.....17	S. indica.....22
D. ?viride.....17	S. kirkii.....23
<u>Drimia</u> .....17	
D. congesta.....17	<u>Thuranthos</u> = <u>Urginea</u> .....23
D. elgonica.....18	
<u>Drimiopsis</u> .....18	<u>Urginea</u> .....23
D. botryoides.....18	U. altissima.....23
D. sp. ....18	U. indica.....23
	U. ?zambesiaca.....24
<u>Eriospermum</u> .....18	
E. abyssinicum.....18	<u>Wurmbea</u> .....24
E. triphyllum.....18	W. tenuis.....24
<u>Gloriosa</u> .....18	
G. minor.....18	
G. virescens.....20	

(Received 18th. August 1961).

#### ANNOUNCEMENT

Ornithologists from other continents or other parts of Africa intending to work on South African birds are invited to make use of the Percy FitzPatrick Institute of African Ornithology, University of Cape Town, as their base. Office or limited laboratory accommodation would be made available; use could be made of the Institute's reference library; access to the collection of the South African Museum could be arranged; and the advice of the staff on matters requiring local knowledge would be at the visitor's disposal. Anybody interested should write to the Director, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch, Cape Province, South Africa.



# COMMON PERENNIAL LILIES OF KENYA WITH EPHEMERAL FLOWERING SHOOTS

## Explanation of Plates

### PLATE I

- fig. 1 Albuca wakefieldii Bak., a. habit, b. part of flower in longit. sect., c. fruit, d. seed.
- fig. 2 Androcymbium melanthioides Willd. var. striatum (A. Rich.) Bak., a. habit, b. flower, c. fruit, d. seed.
- fig. 3 Anthericum gregorianum Rendle, a. habit, b. flower, c. fruit, d. seed.
- fig. 4 Anthericum sp. (= Chlorophytum moniliforme Rendle), a. habit, b. flower, c. fruit, d. seed.

### PLATE II

- fig. 5 Anthericum kassneri Poelln., a. habit, b. flower, c. stamen, d. fruit, e. seed.
- fig. 6 Anthericum subpappillosum Poelln., a. habit, b. flower, c. fruit, d. seed.
- fig. 7 Anthericum uyuiense Rendle, a. habit, b. flower, c. fruit, d. seed.
- fig. 8 Bowiea volubilis Harv., a. habit, b. flower, c. fruit, d. seed.

### PLATE III

- fig. 9 Bulbine abyssinica A. Rich., a. habit, b. flower, c. fruit, d. seed.
- fig. 10 Chlorophytum gallabatense Schweinf. ex Bak., a. habit, b. flower, c. fruit, d. seed.
- fig. 11 Chlorophytum sp. near bakeri Poelln., a. habit, b. flower, c. fruit, d. seed.
- fig. 12 Chlorophytum sp. near macrophyllum Aschers., a. habit, b. flower, c. fruit, d. seed.

### PLATE IV

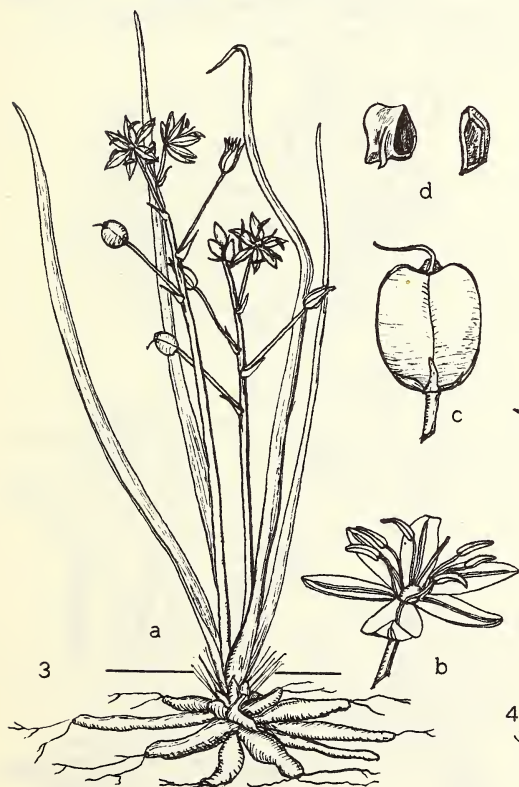
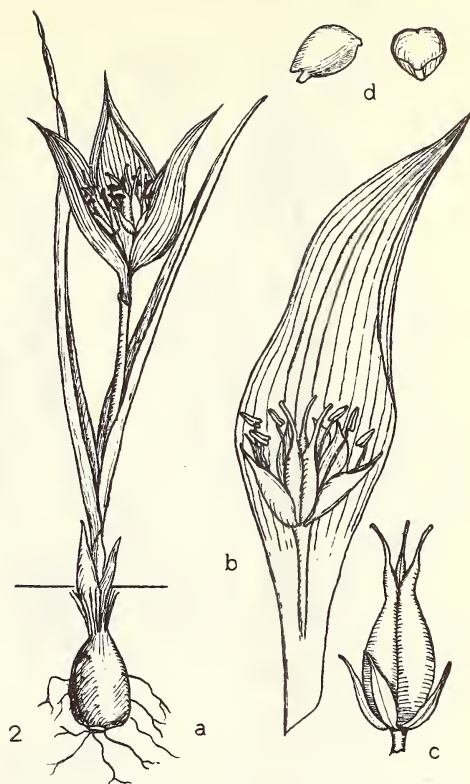
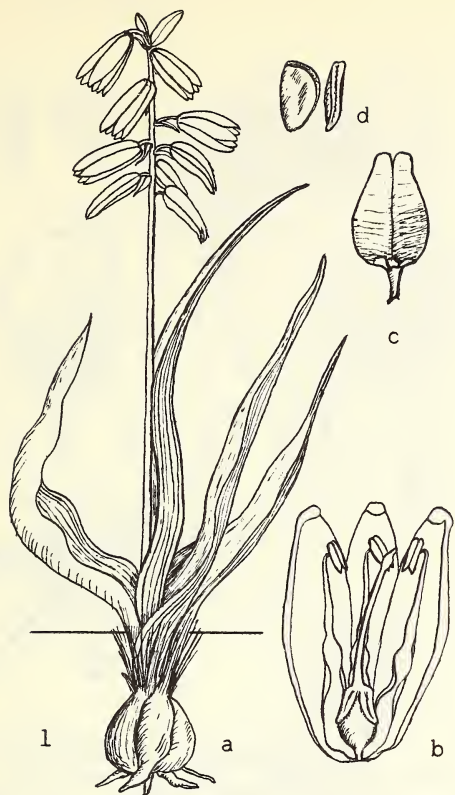
- fig. 13 Chlorophytum tenuifolium Bak., a. habit, b. flower, c. fruit, d. seed.
- fig. 14 Chlorophytum tordense Chiov., a. habit, b. flower, c. fruit, d. seed.
- fig. 15 Chlorophytum tuberosum Bak., a. habit, b. flower, c. fruit, d. seed.
- fig. 16 Eriospermum triphyllum Bak., a. habit, b. flower, c. fruit, d. seed.

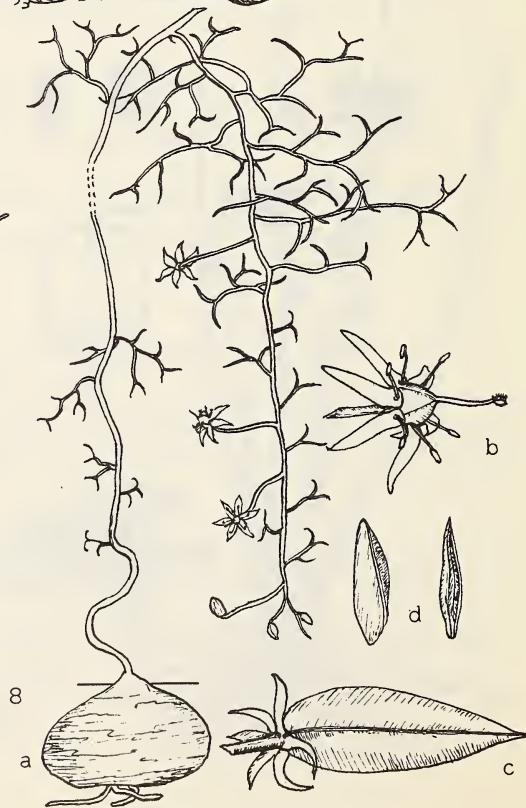
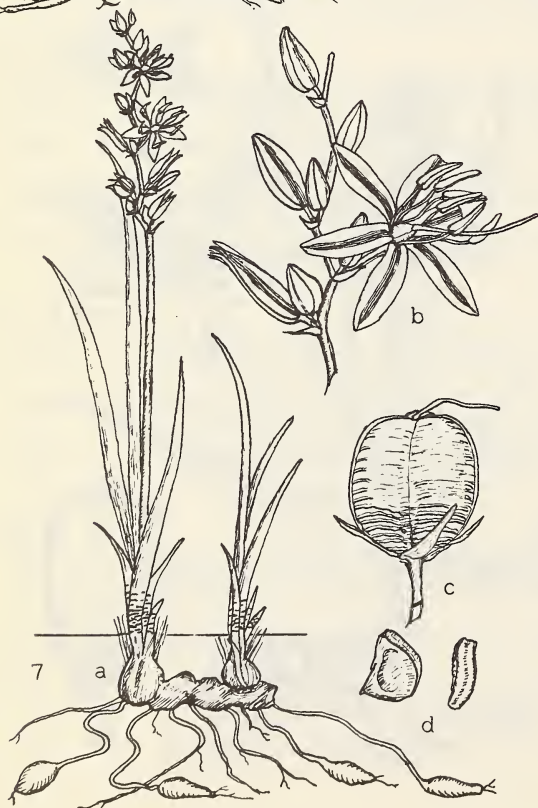
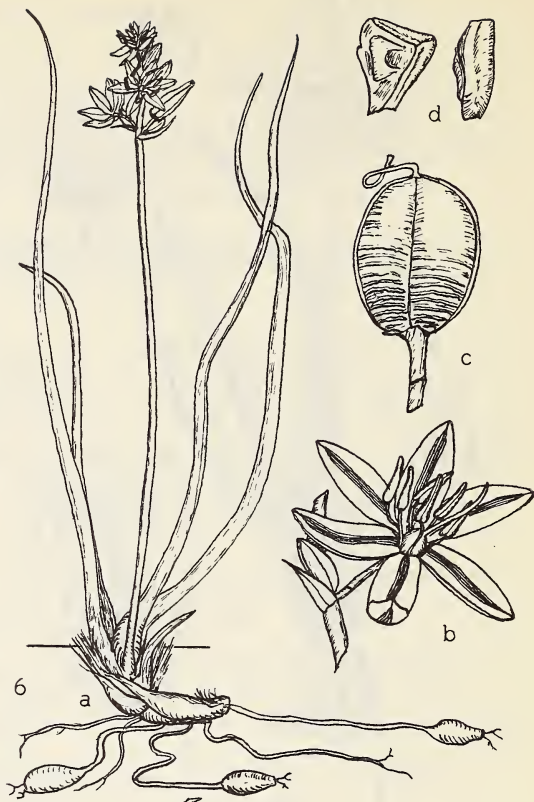
### PLATE V

- fig. 17 Dipcadi sp. near viride (Linn.) Moench., a. habit, b. flower opened out.
- fig. 18 Kniphofia rogersii E.A. Bruce, a. habit, b. inflorescence, c. flower, d. longit. sect. of flower, e. fruit, f. seed.
- fig. 19 Ornithogalum gracillimum R.E. Fries, a. habit, b. flower, c. fruit, d. seed.

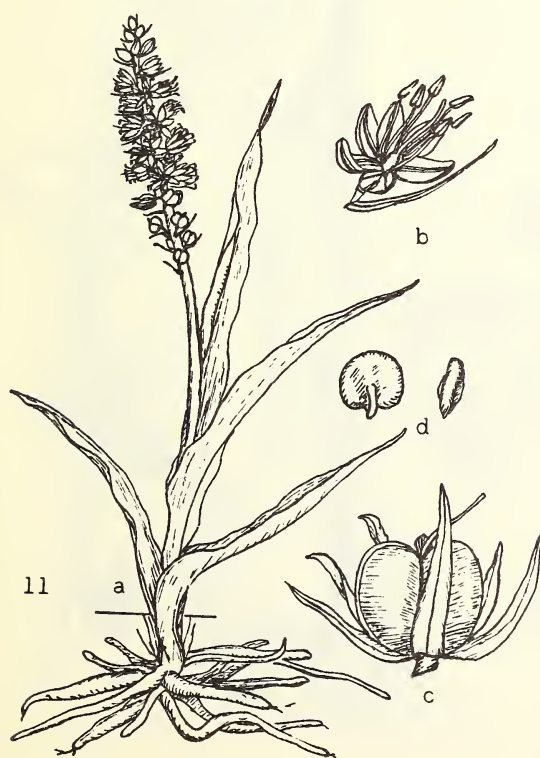
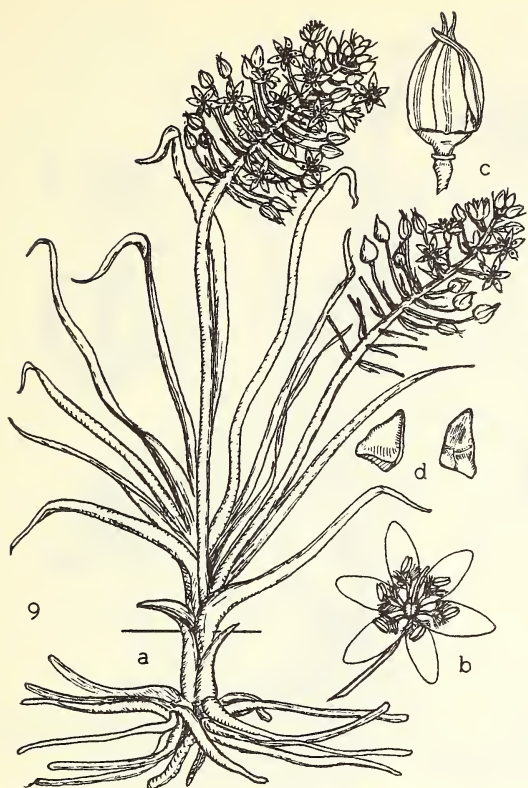
### PLATE VI

- fig. 20 Ornithogalum longibracteatum Jacq., a. habit, b. part of inflorescence, c. longit. sect. of flower, d. fruit, e. seed.
- fig. 21 Scilla indica Bak., a. habit, b. part of inflorescence, c. fruit, d. seed.
- fig. 22 Urginea indica Kunth, a. habit, b. longit. sect. of flower, c. fruit, d. seed.
- fig. 23 Wurmbea tenuis (Hook. f.) Bak., a. habit, b. flower, c. fruit, d. seed.



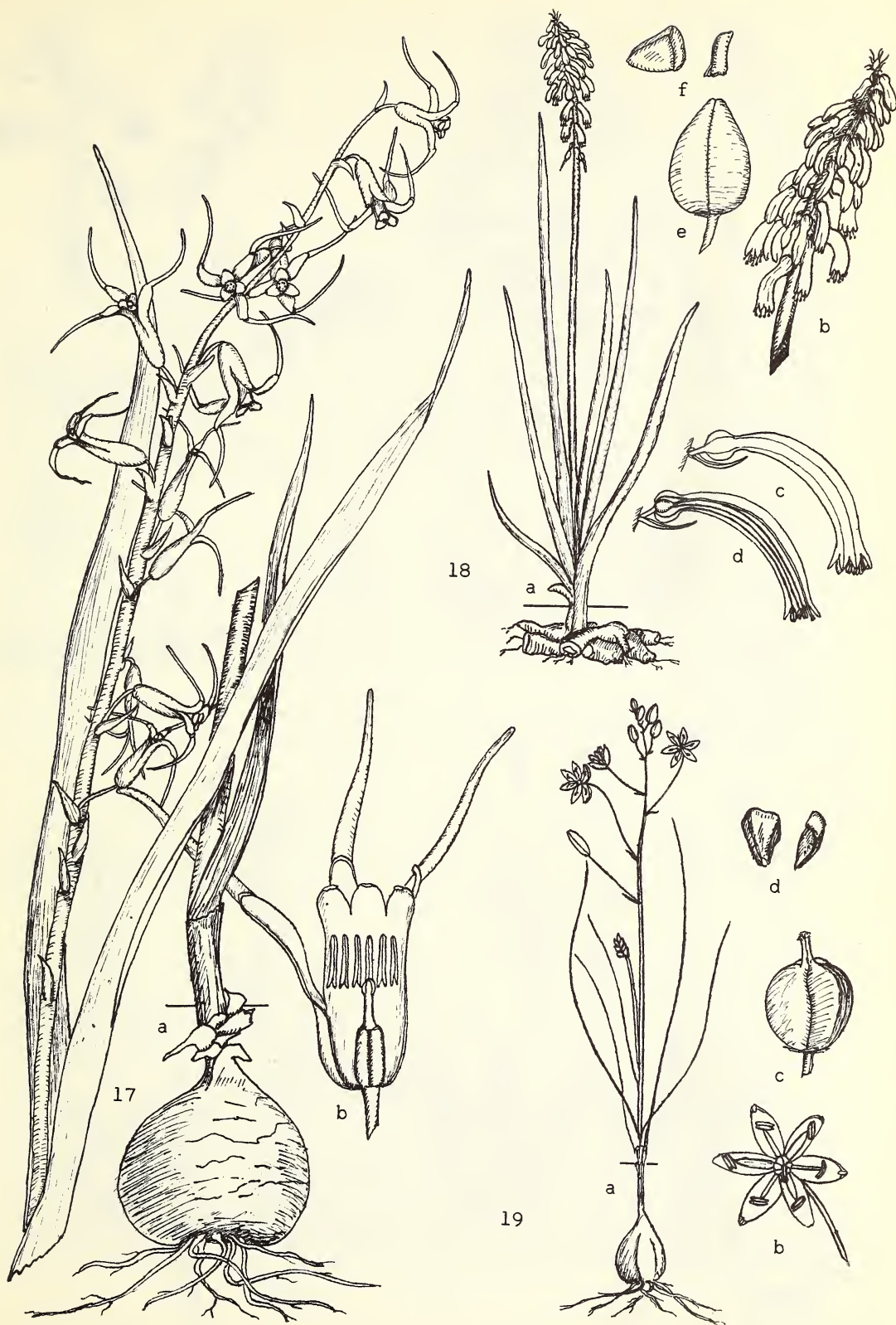




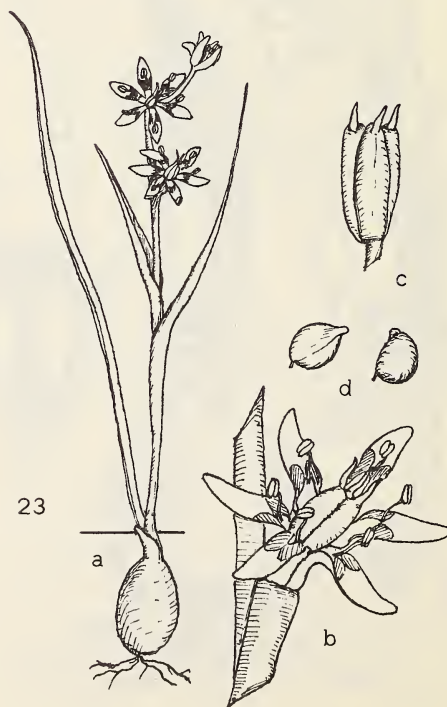
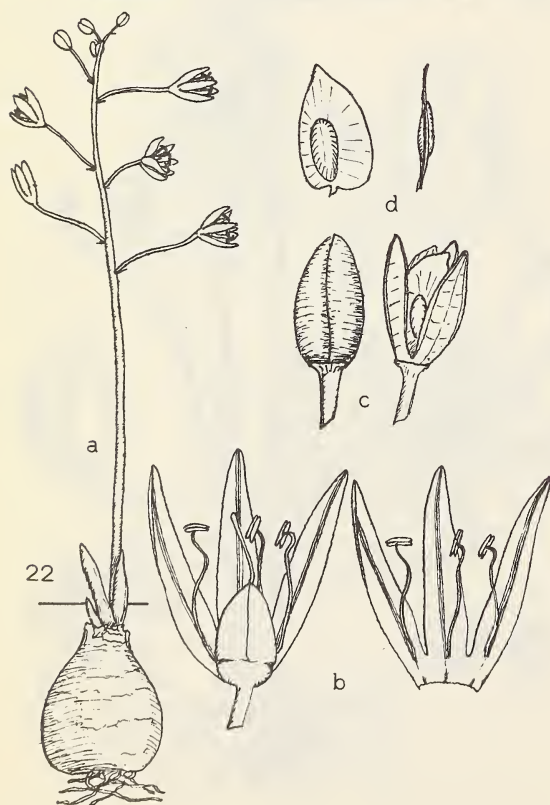
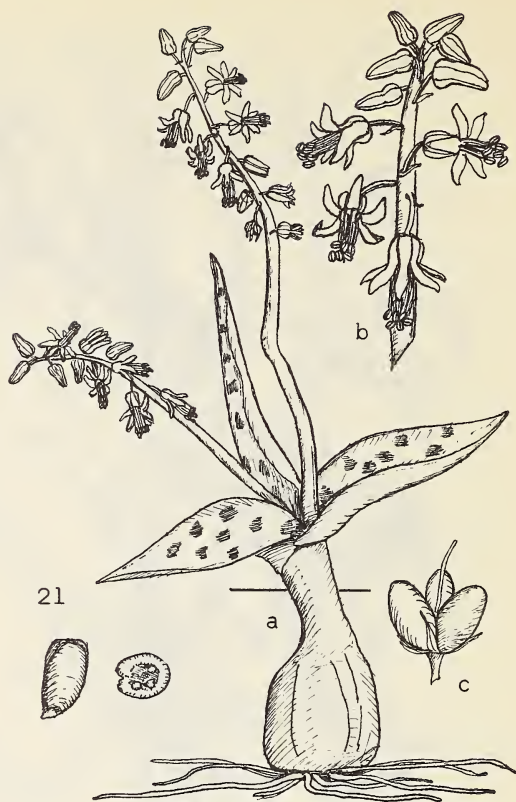












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OBSERVATIONS ON FLOWERING PLANTS FOUND ON THE  
NORTH-WEST SLOPES OF THE NGONG HILLS FROM

October, 1960 to July, 1961.

By

S. HERIZ-SMITH

Beside the murram road, winding away to the right from the main Nairobi/Ngong road, the plants are much the same as those found near and in Nairobi. The pretty yellow Abutilon mauritianum (Jacq.) Medic (Malvaceae) was in flower after the very short rains, and there were also a few bushes of the yellow daisy, Aspilia. But of more interest were three very small plants; the pink Cycniopsis obtusifolia Skan (Scrophulariaceae) clinging to the roadside banks, Justicia elliotii S. Moore (Acanthaceae) with silvery foliage and small magenta flowers, and the bright blue Pentanisia ouranogyne S. Moore (Rubiaceae). This last plant must be one of the longest - flowering on the plains around Nairobi.

Once, however, one reaches the rocky ground on the north-west slope of the Ngong Hills the plant life is generally very different. A peculiarity of the flowering plants in this dry area is their brief existence. In October I found one bush of Ochna growing in a small pocket of soil among the rocks. It was then in full bloom, with many small yellow flowers along the thin branches. Instead of taking the spray I collected to the helpful staff of the Herbarium for proper identification, I put it in a vase. The unaccustomed water went to its head, and petals and pollen were soon scattered all over a corner of the room. My hope of collecting a further piece a fortnight later was not justified as there were neither leaves nor flowers on the dry twigs.

Three other plants, of which only one bush of each species was found in October and November, were Grewia tembensis Fresen. var. kakothamnos (K. Schum.) Burret with many small pale pink flowers, Dombeya rotundifolia Harv. which was more in bud than flower, and an odd rather than attractive species of Ormocarpum with a few yellow pea flowers. Each of these shrubs was almost leafless.

At the beginning of December a very handsome orange species of the parasitic Loranthus was collected - with some difficulty as it was covered with many little red ants. There were also a number of bushes of mauve Grewia similis K. Schum. in flower. At the end of December, when there had been a few showers, the pale blue tubular flowers of the shrub Barleria stuhlmannii Lindau were in evidence, and in the grass Dicliptera napierae Bruce in the same family (Acanthaceae) and the pretty red Hibiscus aponeurus Sprague & Hutch. were found. Both are slender herbs, the former only some 9ins. in height and bearing 2-lipped magenta flowers; the latter varying in height, according to local conditions, from 1-2ft. Beside a cattle track there were clumps of a low-growing member of the Labiatae family, Coleus caninus (Roth) Vatke with purple blooms - rather strong smelling, and a tall shrub, Maerua johannis Volk. & Gilg. (Capparidaceae), which is not exactly eye-catching



from a distance, but on closer examination it is seen to bear many caperlike buds and spidery blooms, the spidery effect being caused by the numerous stamens protruding beyond the rather insignificant white petals.

In the early months of 1961 this area, like many others, was very badly affected by extreme drought. If the grass was not in fact burnt, it looked as though it had been. The only plant found flowering in March was an asparagus, and it was not until the middle of April, when there had been a week of moderate rainfall, that signs of life appeared. The grass was faintly green, and most shrubs were coming into leaf. Another asparagus A. racemosus Willd. was an attractive sight with its large feathery sprays of small yellow flowers. This species differs from other asparagus in the area in that it stands out as a low bush (about 3ft. high) instead of creeping about among other shrubs as most of the asparagus do. A member of an allied genus, Boweia, was found, although not in flower until the middle of May. This rather odd plant with its mass of bright green leaf-like branches and very insignificant pale yellow flowers definitely prefers the support of other shrubs. The only other plant found in flower in April was a species of Solanum (near S. incanum L.) one of the more attractive of this genus, having large mauve flowers, small velvety leaves and less obtrusive spines.

On the plains bordering the approach road the only plants seen in flower were a small Oxalis (O. purpurata Jacq.) and the magenta Justicia elliotii S. Moore, like Pentanisia a very persistent flowerer.

A month later, however, the situation on the plains was very different. It is here of interest to note that the plants on the Athi plains were in full flower at least a month before those at Ngong. Although both areas were previously very parched by the drought, it is probable that there is more subsoil moisture in the Athi plains than the Ngong Hills area which looked as though every drop of moisture had drained away. Whatever the explanation for this delay, the bright orange Thunbergia gregorii S. Moore was well worth waiting for.

Another striking plant seen, although not very common, was Celsia floccosa Benth. (Scrophulariaceae) with its long spikes of bright yellow flowers, the plants seen were about 2-3ft. high. On a bank beside the road the spreading, bright magenta, Commicarpus pedunculatus (A. Rich) Cuf. (Nyctaginaceae) was abundant. The flowering stalk of this plant is about 5ins. long, and grows from the axil of opposite broad based leaves. Small bulbous plants seen in numbers were the white Chlorophytum moniliforme Rendle (Liliaceae), the white bells of Acidanthera candida Rendle (Iridaceae) and the starry yellow Hypoxis villosa Linn. f. (Hypoxidaceae).

A list of other attractive small plants found would include the purple Lightfootia abyssinica Hochst. (Campanulaceae) - small starry flowers on a slender stem; pink Silene burchellii [Oth ex] DC. (Caryophyllaceae); members of the Labiatae such as the mauve Plectranthus longipes Bak. with round opposite leaves and clumps



## Flowering Plants on the Ngong Hills

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of another species of Coleus; Rhamphicarpa heuglini Hochst., the large pale pink flowers of which are quite visible although the foliage is hidden in the grass; the low-lying shrub Sida ovata Forsk. with pretty pale yellow cupped flowers, and Vigna vexillata Benth a trailer with large 'sweet pea' flowers in shades of mauve and pink. Even smaller plants found were Monsonia biflora DC. with pale mauve flowers and the typical 'Storksbill' carpels; a member of the Convolvulus family Ipomoea sinensis (Desr.) Choisy; and a very pale mauve daisy - Aster hyssopifolius Berg.

I would here comment that although a number of these plants are also found on the plains to the east of Nairobi, the attractive salmon Crossandra subacaulis C.B.Cl. which is very much at home in the Nairobi National Park, is not seen at all at Ngong, and the Ngong Thunbergia gregorii (also of the Acanthaceae) is not to be seen elsewhere near Nairobi. A matter of altitude I should imagine.

When next I visited the area about the middle of June, the hills were looking fresh and green, although the rain had not been particularly heavy. A number of plants previously mentioned were still in flower, but small newcomers on the plains were Rhynchosia memnonia DC. (a creeping member of the Papilionaceae), white Helichrysum glumaceum DC. and two white Justicia-J. uncinulata Oliv. and J. exigua S. Moore. A larger species of Hypoxis (H. urceolata Nel.) was seen, and by the road the attractive tall Heliotropium pallens Dell. was in flower; also Vernonia brachycalyx O. Hoffm. and a few Clerodendrum myricoides (Hochst.) R.Br. ex Vatke (the blue Butterfly bush). The roots of the latter are said to be used medicinally, particularly by some of the pastoral tribes.

On the lower slopes the plants again varied. Several Compositae were found - as well as the common Athroisma psyllioides (Oliv.) Matt f. the small white Nidorella pedunculata Oliv. was fairly widespread, and Helichrysum schimperi (Sch. Bip. ex A. Rich.) Moeser, with bright yellow flowers and silvery foliage, grew in small clumps among the rocks. Quite the most attractive plant in flower here was the tall Ferula communis L. (Umbelliferae). The leaves are very deeply cut and 'fernlike' in appearance. The main flower stalk grows erect from the centre of the plant; it then branches almost horizontally and produces typical umbels of numerous bright yellow flowers. On the same day on which I found this plant blooming, I also surprised three klipspringer on the rocks. We stared at each other, equally curious, until a large truck coming along the road was too much for these antelope.

In July the shrubs were in full flower. The most abundant were Barleria stuhlmannii, Vernonia brachycalyx and Jasminum fluminense Vell. Only one specimen of Crotalaria saxatilis Vatke was seen with its small yellow to mauve flowers among the dense foliage. The red fruits of Coccinea trilobata (Cogn.) Jeffery (in ed.) added a cheerful note to the scene, an ever-fascinating scene, whether at close quarters or as part of these Hills overlooking the vastness of the Rift Valley.

(Received 11th. November 1961)

## REPORT ON A COLLECTION OF EAST AFRICAN SLUGS (UROCYCLIDAE)

By

B. VERDCOURT

## INTRODUCTION

Since the publication of my synopsis of East African slugs\* further material has been collected by myself or handed to me for naming. Further collections are needed from all areas; even in Nairobi itself there is an elusive new species which has been collected only twice, neither specimen being in a state suitable to decide even the correct genus.

Since the appearance of the last part of the synopsis a most important paper has appeared; on the first page of my paper I mentioned that Dr. Sigrid Urban had written an exhaustive thesis on the anatomy and histology of Trichotoxon. This she found difficult to publish in East Germany but it has now been possible to publish it\*\* in Belgium by the kind cooperation of Prof. Benoit of the Musee de L'Afrique Centrale, Tervuren. I have always advocated that the larger Urocyclid slugs would be ideal for teaching purposes in East Africa. The importation of snails from biological supply houses in Europe is absurd when local material is on the doorstep. Slugs are easier to prepare and dissect than snails. The publication of Miss Urban's detailed work renders it much easier to use the slugs for very advanced studies\*\*\*. The following notes follow the order used in the synopsis and references are omitted. All the material is deposited in the Coryndon Museum, Nairobi.

## ATOXON

One specimen, unfortunately badly preserved and accompanied by no colour notes was present in a collection of molluscs handed over to me for study by the Second Oxford University Tanganyika Expedition. As has been mentioned, the confusion in this genus is so great that the description of singletons is not advisable. Until large collections from type localities are available nothing

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\* Vide this journal 23, 200-209 (1960), 23, 233-240 (1960) and suppl. 7, 1-36 (1961)

\*\* 'Anatomie und Histologie von Trichotoxon thikensis Verdcourt, Ann. Musee Royal de L'Afrique Centrale Sci. Zool. No. 97, 114 pp. including 36 plates (1961) (note my original spelling thikensis is inaccurate - Trichotoxon is neuter and the specific epithet should be thikense. Miss Urban uses the correct spelling in her text but not on the cover of which she probably did not see proofs).

\*\*\* At the coast the large species of Achatina are ideal for dissection in schools. Anatomical studies have been carried out by Dr. Mead of several of our species (vide Mead, A.R. Comparative Genital Anatomy of some African Achatinidae. Bull. Mus. Comp. Zoo. 105, No.2 (1950)).

can be made of most of Simroth's species.

Atoxon ? sp. nov. (Figs.1,2,3)

Body "tadpole-shaped", forebody very swollen due to the extreme maturity of the genitalia, tail very slender and narrowed to the tip. The body is blackish-brown in colour, the mantle darker, with a few large spots; there are minute specks of white particularly below the mantle where the body is stretched and there is also an irregular pattern of larger, darker, brown marks. The foot is 18.5 mm. long and the body 7 mm. wide. The mantle is 10 mm. long, the prominent pulmonary aperture 4 mm. from the anterior margin; the pallial hole is stretched wide open, 1.5 mm. long, showing the white shell nucleus beneath. The hind body is not keeled and is 9.5 mm. long measured along the dorsal surface.

The shell is oblong-oval and quite thick for such a small species, 4.5 mm. long and 2.75 mm. wide, greenish-white with a greenish-brown hyaline margin, the nucleus situated right on the posterior margin, striate very finely concentrically and extremely finely radially; the crystalline structure of the shell is irregular.

The genitalia are mature and are figured in fig.2, the elongate spermatheca passes very gradually into the shorter duct. The liver extends backwards to a fine point about 3 mm. from the tail end of the body.

TANGANYIKA. Western Province, Mahari Mountains, Kasangazi, in the axils of old outer leaf bases of wild banana by streams, 4500 ft. alt., 29 Sept. 1959, leg. D.H. Eccles. Although the combination of small size and very pointed tail probably indicate specific distinction, the shape may be partly due to bad preservation. The position of this form is left until more material is available; it is considered, however, useful to put the details on record since spirit material is always in danger of being spoiled. Atoxon brunneum Simroth would appear to be the nearest affinity.

Atoxon flavum Simroth

The single specimen is rather damaged, the shell being missing, but the characters fit well with Simroth's species. The body is pale brownish-ochre with dark grey-brown spots; the spots are arranged in irregular bands on either side of the mantle and the hind body (Fig. 4). The mantle is 1.2 cm. long and the back 2 cm. long; the sole is 3 cm. long and 4 mm. wide (1.3:1.3:1.3). The tail is slender but the gut area very swollen. The spermatheca is sausage-shaped, 4.5-5 mm. long, with a globular central swelling due to a spermatophore and the duct is 5 mm. long.

UGANDA. Kigezi District, Kisizi Falls, 30 miles from Lake Bunyoni, 1960, leg. J.D. Goodman.  
Two lots of this genus, collected outside of East Africa have also been examined.

Atoxon sp. nov. (Figs. 5,6)

Body 2.4 cm. long, grey-buff without any marks; mantle 10.5 mm. long, grey-buff with irregular black markings. The whole slug is granular. Hind body slightly keeled towards the tail. Pulmonary aperture about 4 mm. from the posterior mantle margin. Sole 2.2 cm.



long, the areas 1.3, 1.3, and 1.3 mm. wide respectively. The genital anatomy is that of Atoxon; there is no trace of a dart sac, nor does it seem likely that one would develop later. The hermaphrodite gland is placed at the extreme end of the viscera behind the liver and was the only part of the genital system which was found to be fully developed.

In the area from which this slug was collected only Urocyclus species have been previously recorded. Some of these have not been dissected and may be generically wrongly placed. However, the present slug does not match any of the descriptions of Urocyclus available to me. Although it seems unwise to describe it without more mature material, it is worth a full mention since it represents the most southerly occurrence of a species of Atoxon.

PORTUGUESE EAST AFRICA. Gorongosa Mountain, 4000 ft., Sept. 1957, 1 small specimen and 2 very small specimens, leg. E. Pinhey.

Atoxon hildebrandti Simroth

This species is the genotype of the genus Atoxon and recently Mr. C.F. Hemming has presented to me several specimens collected near to the type locality, presumably the first obtained for about 75 years.

The largest specimen in lot M 166 has the body 5.1 cm. long, the sole 4.5 cm. long and 7.5 mm. wide and the mantle 2.6 cm. long. Apart from the general colours mentioned below, the whole of the mantle and hind body are strongly reticulate, the paler brown areas filled with white pigment specks and the grooves forming the reticulation dark brown. The mantle is brown with an obscure dark stripe on either side; to the outside of these stripes the mantle is paler. The flanks are pale grey-brown but the back is darker, with a line of dark spots on either side and a few scattered spots above and below the line. The pulmonary aperture is 12.5 mm. from the posterior margin of the mantle, which is strongly sinuate. The shell is oval, callus-filled, but with a very hyaline margin, pale horn-coloured, with a white raised nucleus, well overhanging the posterior margin, glossy, with concentric and radial striae, 8.5 mm. long and 5.5 mm. wide. This specimen was dissected and the genitalia are figured in Fig. 7a. The hermaphrodite gland is 8 mm. long and 4 mm. wide, buried just in front of the last lobe of the liver; the duct is 38 mm. long. The spermatheca was swollen with a large smooth spermatophore and measured 16 mm. in length and 5 mm. in width, with duct about 5 mm. long. The flagellum is minute but the lime gland is 33 mm. long outstretched. Another specimen from lot M 166 had a very leathery integument; the body was 4.4 cm. long and the mantle 1.95 cm. long. The whole body is very reticulate, a dark blackish reticulation marking off paler brownish areas. The general colour of the mantle is dark grey with black side bands, the marginal areas to the outside of the bands pale with black spots. The sole and the flanks below the mantle are pale, unspotted, head blackish-grey above. Hind body grey-brown above, paler beneath, the median line obscure, brownish and not raised in a keel; the sides are densely spotted with fairly large, dark blackish spots. In a smaller specimen from the same lot, the spots on the hind body are reduced to a single narrow, somewhat interrupted band on each side. Neither of these two further specimens was dissected.

The single specimen forming lot M 167 had a total length of 3.7 cm. and a breadth of 1.1 cm.; the sole is 7 mm. wide, each area about 2.3 mm. wide. The mantle is broad, 1.7 cm. long, markedly sinuate along the posterior margin, grey-brown with an obscure blackish interrupted line on either side. The back is grey-brown above with a brownish, unraised median line, and paler ochraceous below, with some black spots. The pulmonary aperture is 8.5 mm. from the posterior margin of the mantle. In this specimen the hermaphrodite gland and duct are exactly as in M 166 but other organs are rather smaller, particularly the spermatheca (containing no spermatophore) which measures 8.25 mm. long and 3 mm. wide with a duct about 4 mm. long (fig. 7b). The lime gland is 27 mm. long. The overall reticulation of the body is just as noticeable as in M 166.

The two baby slugs comprising lot M 172 are believed to be this species but the genitalia are completely lacking. The body is 2.2 cm. long and the mantle 9.5 mm. long, the general colour brownish with a dark line on either side of the mantle and a few obscure dark marks on the hind body.

SOMALI REPUBLIC, N.REGION. Upper Sheik, under a stone in shade of Acacia, 4650 ft., 17 September 1960 (one) and 19 September 1960, leg. C.F. Hemming M 166. Ala'ouleh, 9 miles W. of Sheik, in gardens watered by a spring up a narrow side valley; the spring is within a few feet of the lowest Juniper and the area is really in Buxus hildebrandtii, 5600 ft., 18 September 1960 (one), leg. C.F. Hemming M 167. Waggar Mts., under stone in shaded site in grassy high valley between ridges, 5000 ft., leg. 19 September 1960 (two small slugs).

#### TRICHOTOXON

##### Trichotoxon heynemanni Simroth

A greenish-white slug with black grooves on some parts of the hind body.

TANGANYIKA. East Usambaras, Kwamkoro, on leaves of undergrowth in rain forest, 16 May 1961, leg. W. Wilkinson.

##### Trichotoxon thikense Verdcourt

A cream coloured slug with purple fringe, about 7 cm. long. In the Kimakia specimens the dart sac is 2.2 cm. long.

KENYA. Naivasha District, Bamboo Forest, Sasumua pipe line road, 11 Dec. 1960, Polhill, Verdcourt and Lucas 208 (two specimens). Naivasha District, Bamboo Forest, near Kimakia, 11 Dec. 1960, Polhill, Verdcourt and Lucas 205 (four specimens).

##### Trichotoxon bambuseti Verdcourt & Polhill

A speckled white and grey slug, the oblique grooves on the back white, the zones between brown, marbled with dendritic white markings. The dart sac is 17 mm. long and 6 mm. wide, it is bifid slightly at the apex but the emargination is filled up with the lower parts of the oviduct and spermathecal duct.

KENYA. Naivasha District, Bamboo Forest, on Sasumua pipe line road, 11 Dec. 1960, Polhill, Verdcourt and Lucas 206.

Trichotoxon copleyi Verdcourt subsp. copleyi

A small specimen, deep rich brownish-ochre coloured with grooves of hind body a much darker brown.

KENYA. Machakos District, Uuni, in hollowed tree branch, in Acacia-Combretum scrub with scanty grass and herbs on hillside, low (c. 20 inches?) rainfall, 4500 ft., 23 Nov. 1960, leg. W.Wilkinson.

Trichotoxon copleyi Verdcourt ? var.

The following slug may be only a colour variant of T.copleyi. It was brought to me alive and the colours were taken from life. Outstretched it measured 12 cm. long; unstretched it measured only 6 cm. long, and after drowning and preserving in spirit, 6.5 cm. The head is blackish-grey; mantle and body dark brown, strongly shagreened, the small raised areas convex; mantle and fringe slightly darker than the hind body, sole grey-brown with middle area pale bistre. In spirit the general colouration is purple-brown, the sole dull purple-brown with middle area pale grey-white. The dart sac is 8-9 mm. long, slightly curved and very obtuse at the apex. More adult material is required of this form. It may well be a local colour variant. The Mua Hills have been separated from other areas by seasonally dry plains for a very long time although they are only a short distance from Nairobi.

KENYA. Machakos District, Mua Hills, 17 May 1961, leg. J.G. Williams and B. Parsons.

Trichotoxon copleyi Verdcourt var.

This is adult material of the Kitale form mentioned on p. 29 of my synopsis.

Body (contracted in spirit) about 6-8 cm. long. Sole with mid-area about 4 mm. wide and outer areas 4.5-5 mm. wide. Mantle 3.2-3.7 cm. long and back 3.7-4 cm. long. Back dark grey-brown, paler below the mantle but darker than in the Nairobi form. Shell greenish-horn coloured, 10-11 mm. long and 8-9 mm. wide. The dart sac is 2.2-2.8 cm. long and contains about 17 very slender darts 20-25 mm. long. The spermatheca is 8-9 mm. long and 3.5-5 mm. wide and the duct 1.5-2.5 cm. long (Figs. 8, 9).

KENYA. Kitale, April 1961, leg. A.V. Bogdan (12 specimens).

Also in this area is a spotted slug which probably belongs to the same species. The body is grey-brown with brown spots; the fringe is more or less white with dark lines; mantle granular. This was seen between Hoeys Bridge and Kitale but not collected.

Trichotoxon copleyi Verdcourt var.

The following also appears to be a dark form of copleyi. It is much contorted due to the method of preservation. The dart sac is 2.6 cm. long, truncate at the apex; the spermatheca is sausage-shaped 1.3 cm. long and 2-3 mm. wide, the duct 2.4 cm. long.

KENYA. Masai District: Olosendo, N.E. of Lolgorien, GZM 603723, 19 June 1961, leg. M.D. Gwynne.

Trichotoxon (Atrichotoxon) usambarense Verdcourt

In spirit the hind body of this slug is pale purplish-brown and



the mantle is a little darker. The mantle is 2.9 cm. long and very granular with slightly raised, round protuberances, 0.5-1 mm. across, which in life may have been more elevated. The hind body is 4.7 cm. long. The genitalia are shown in fig. 10.

TANGANYIKA. East Usambaras, Kwamkoro, on leaves of undergrowth in rain forest, 15 May 1961, leg. W. Wilkinson.

#### Unidentified species

The following six species could not be referred to their genera since the genitalia were undeveloped. More adult material is needed of all of them; at least some are new species.

1) A slightly granular slug, whitish in colour, speckled with liver-red-purplish specks; a lateral band on each side of the mantle composed of many blackish dots. Mantle 8.5 mm. long, hind body 8 mm. long, very slightly keeled throughout.

KENYA. Meru, in litter of upland rain forest, 5500 ft., Oct. 1960, leg. Verdcourt & Polhill 184.

2) A pale bistre slug with pale brown spots on the hind body and about ten darker brown spots scattered near the keel, which is not raised, save at the extreme end. There is a pale brown band on either side of the mantle made up of coalescent spots and the area between is speckled with minute brown spots. The mantle is 10.5 mm. long and the hind body 13.5 mm. long.

KENYA. Nairobi, found on a banana, probably introduced on it from elsewhere in the territory, leg. B. Verdcourt.

3) A white slug with a slight greyish tinge. The mantle bears some characteristic grey marks made up of minute grey dots (Fig. 11) The sole measures 3.7 cm. long and its areas 1.5, 1.0 and 1.5 mm. in breadth respectively; the hind body is 1.7 cm. long, scarcely keeled and the mantle is 1.8 cm. long. The shell is thick, oblong-ovate, of a very pale yellow-brown horn colour with a prominent white nucleus. It measures 5.3 mm. in length and 3.5 mm. in breadth and has concentric striae with some prominent radial wrinkles between some of the outer striae. The genitalia were completely immature. It may be a species of Atoxon.

KENYA. Nairobi, in banana plant, leg. Alexander.

This is undoubtedly the same species as the slug collected in Nairobi by J.G. Williams mentioned on page 32 of my synopsis. It should not be long before some adult material is collected and the species can be described.

4) An almost transparent slug with the dark gut showing through the body wall, mantle a very pale olive green; in spirit the body appears cream all over. The hind body has a very strong keel. Possibly a very juvenile Trichotoxon.

KENYA. Nyambei Hills, Kirima Peak, in upland rain forest, 6500 ft. leg. Hemming, Howland & Verdcourt.

5) A pale cream slug with one faint band on either side of the mantle. Total length 2.2 cm., mantle 0.85 cm. long and hind body

1.3 cm. long.

TANGANYIKA. East Usambaras, Kwamkoro, on leaf of undergrowth, in rain forest, 17 May 1961, leg. W.Wilkinson.

6) A greyish-white slug with sole pure white, mantle and hind body characteristically speckled with numerous minute black specks, a band on either side of mantle and body made up of larger black spots. A pale line along the back, which is not raised in a keel, is devoid of spots. The head and neck have a pavement effect of grey areas with white grooves between (Fig. 12).

The genitalia of this specimen were vestigial but suggestive of Trichotoxon sensu stricto. Further material should be looked for of this almost certainly undescribed species.

TANGANYIKA. East Usambaras, Kwamkoro, under bark of log in rain forest, 18 May 1961, leg. W. Wilkinson.

#### Geographical Distribution of the Urocyclidae

From the point of view of distribution, so far as present knowledge is concerned, the family can be divided into two groups

##### A. Small genera confined to limited areas

- Leptichnus (Tanganyika)
- Phaneroporus (Tanganyika)
- Estria (Guinea)
- Aspidelus (Cameroons)
- Buettnerella (Angola)
- Kirkia (Portuguese East Africa, a doubtful genus)
- Microcyclus (Togo)
- Urocyclus subg. Mesocyclus (Uganda, Toro)
- Urocyclus subg. Comorina (Comoro Islands)
- Varania (Cameroons, a dubious genus described from a badly preserved specimen obtained from the stomach of a monitor)

##### B. Widespread genera. Only these are marked on the accompanying maps (Figs. 13 and 14)

- 1) Atoxon. This genus extends from the Al Mountains in N. Somalia, Ethiopia (Arussi-Galla), Kenya, Uganda, E. Congo, Tanganyika to Portuguese East Africa and Lower Congo (Kuako). It is found in forest areas of limited extent on mountains surrounded by very arid country, as well as in extensive rain forest, mostly 4000-7000 feet.
- 2) Dendrolimax. This extends from Princes Island, S. Tome and W. Africa across to Thika in Kenya. Lower altitudinal limits not known but certainly extends up to 5000 ft. The presence of this genus at Thika is remarkable but the affinities of the organisms in the gorges are diverse. Many of the molluscs have "north-south affinities", one of the plants (Heywoodia lucens) has a peculiar disjunct distribution including Natal and Bukoba; the Nandi Flame trees (Spathodea campanulata) in the gorges certainly appear to be native, indicating another Western affinity.

- 3) Bukobia. Mostly in W. Uganda and near Lake Victoria with one species near Nairobi in Kenya. Mostly about 4000-7000 ft.
- 4) Urocyclus sensu stricto. There is an error in my synopsis part 2, p. 237. The genus does not occur in the Mascarene Islands proper (i.e. Mauritius and Réunion) but in the Comoro Islands and Madagascar, Natal, Portuguese East Africa, Tanganyika coast, Pemba Island and Kenya coast, at just above sea level to about 4300 ft. A species described from Cape Town has dubiously been ascribed to this genus but needs recollecting. It may not even have been a Urocyclid.
- 5) Trichotoxon. The typical subgenus extends from the coast to Kenya, N. Tanganyika, Uganda and to the eastern Congo. Subgenus Polytoxon has a similar distribution but is rarer towards the coast and extends further north to Kulal and the S.E. Sudan. The two small subgenera Atrichotoxon and Spirotoxon are complicated since two of Simroth's species are devoid of proper localities and one Ethiopian locality has not been traced. Other species come from East Usambaras, Kingani River and Teita Hills.

In a study of the Miocene Molluscs of Kenya (in the press) I have shown that Urocyclid slugs, probably species of Trichotoxon and Atoxon, were abundant at Rusinga and Mfwangano, now islands in E. Lake Victoria. Similar fossils possibly of Miocene age have been picked up at Mara Bridge. Slug shells fossilise easily. In the Chania Gorge at Thika, Mr. Polhill has found old callus-filled shells in the soil (Polhill 116), presumably those of fairly recent Trichotoxon thikense.

C. Piersanti (Miss. Biol. Sagan-Omo, Zool. 6, 263-5 figs. 1 & 1A (1941) has described a Urocyclus (Parmarionopsis) elbannoensis from El Banno, but without further material (the original three examples were destroyed during the war), it is not possible to decide what genus the species belongs to, since none of the internal anatomy is described, save for three photographs of the radula. Topotypic material will be easily recognised since he describes the external characters and the shell in some detail. His reason for the new subgenus is not clear but he says it is intermediate between Urocyclus and Parmarion (an oriental genus). From the radula alone I am not able to identify the genus. Only topotypic material will solve the problem. El Banno is in the Tertale province of Ethiopia, to the east of Lake Stefanie.

(Received 21st. November 1961)



East African Slugs

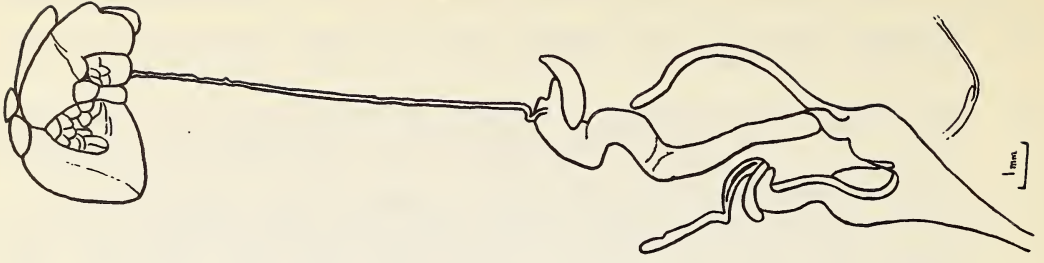


Fig. 6

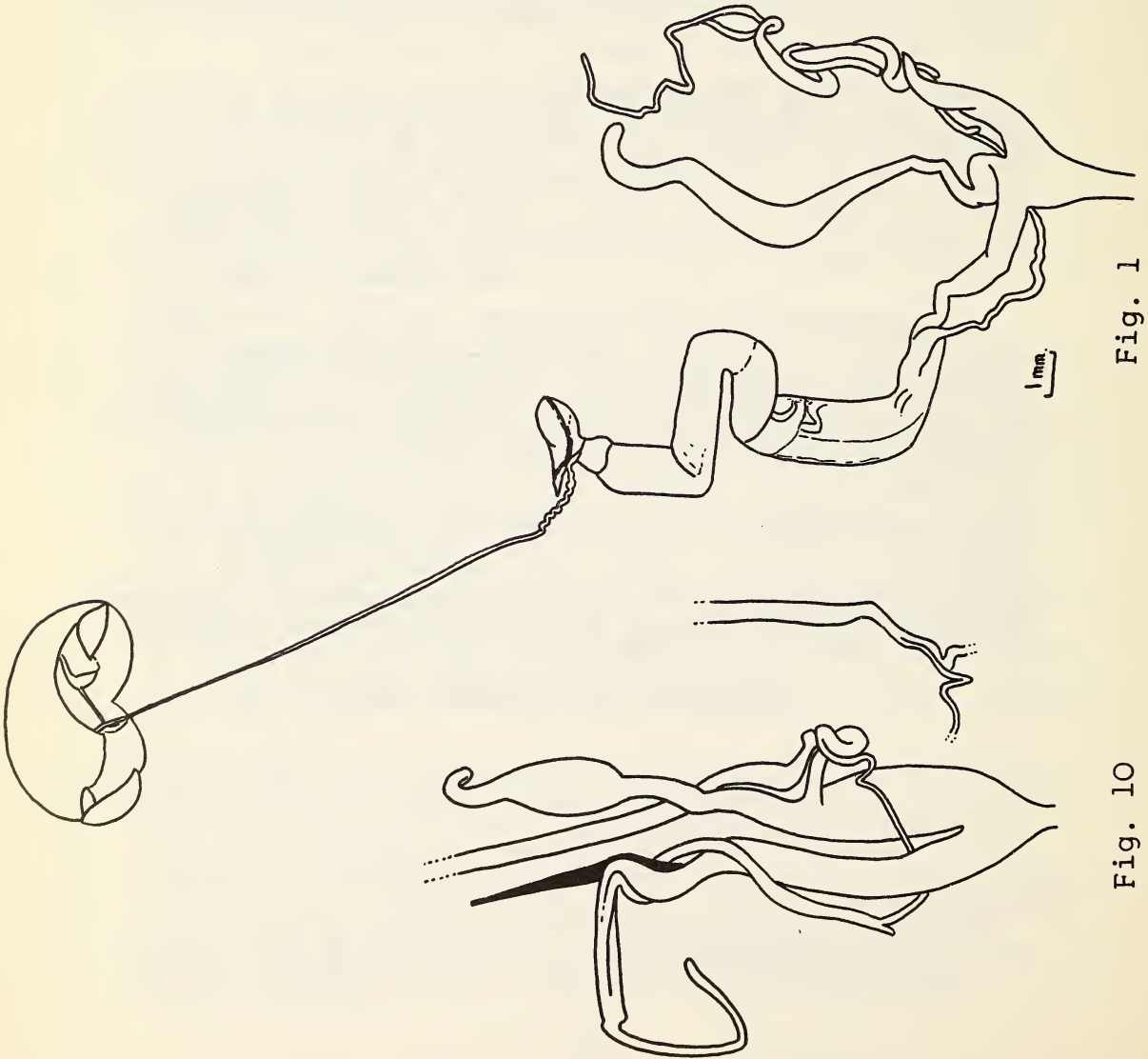
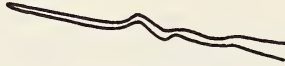


Fig. 1

Fig. 10

# East African Slugs



Fig. 2



Fig. 3



Fig. 4



Fig. 12



Fig. 11



Fig. 5



Fig. 8



Fig. 9

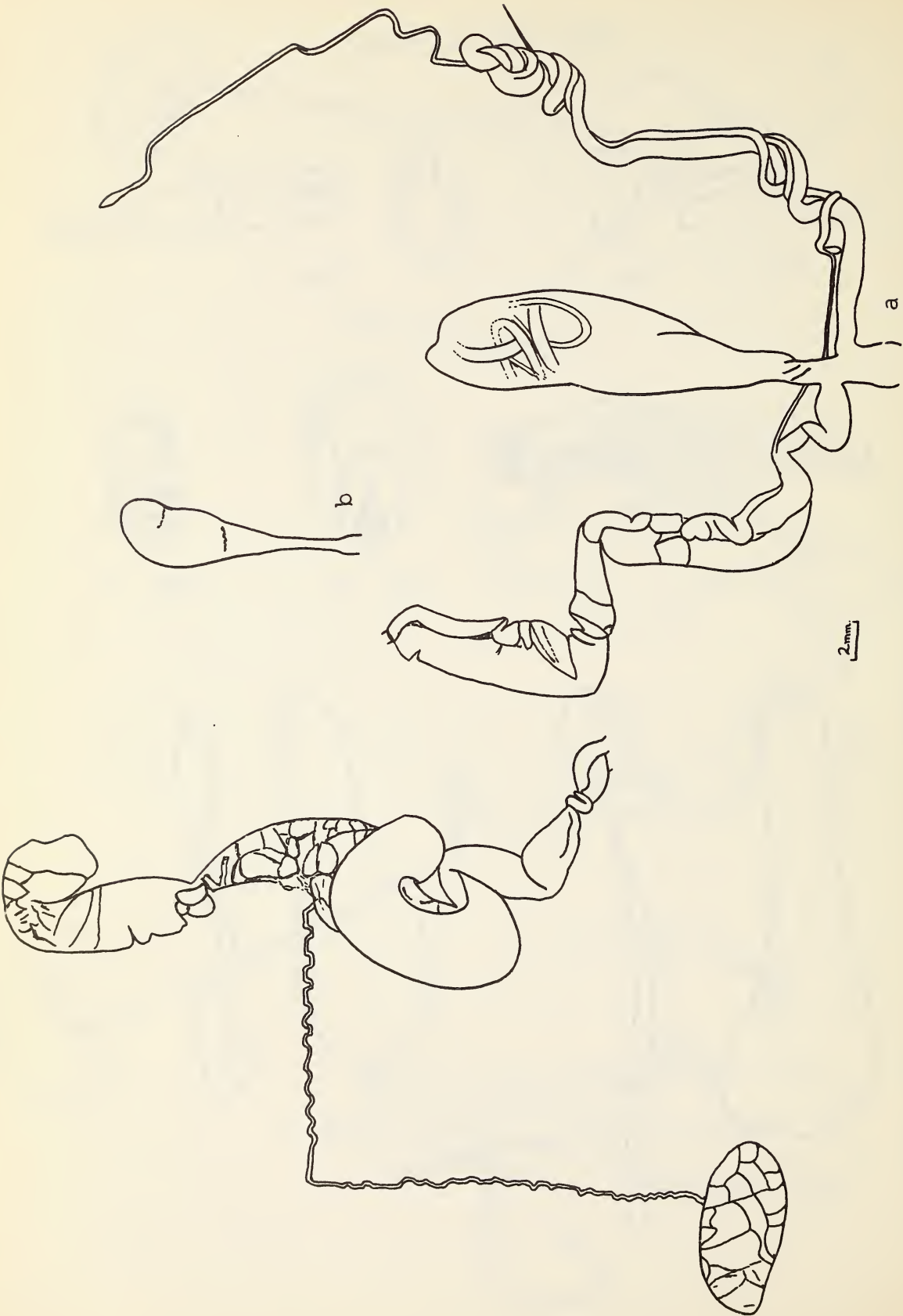
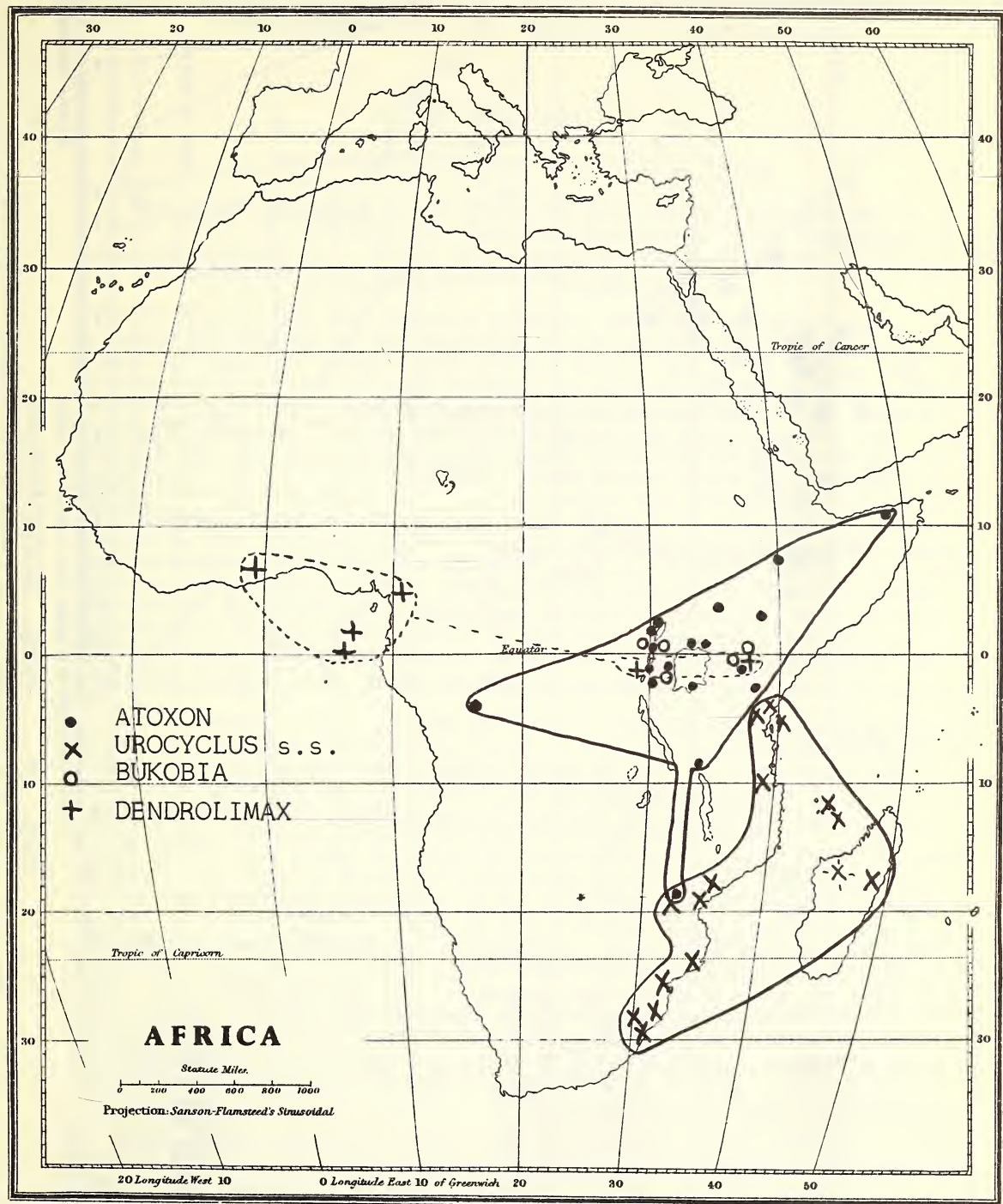


Fig. 7



# East African Slugs



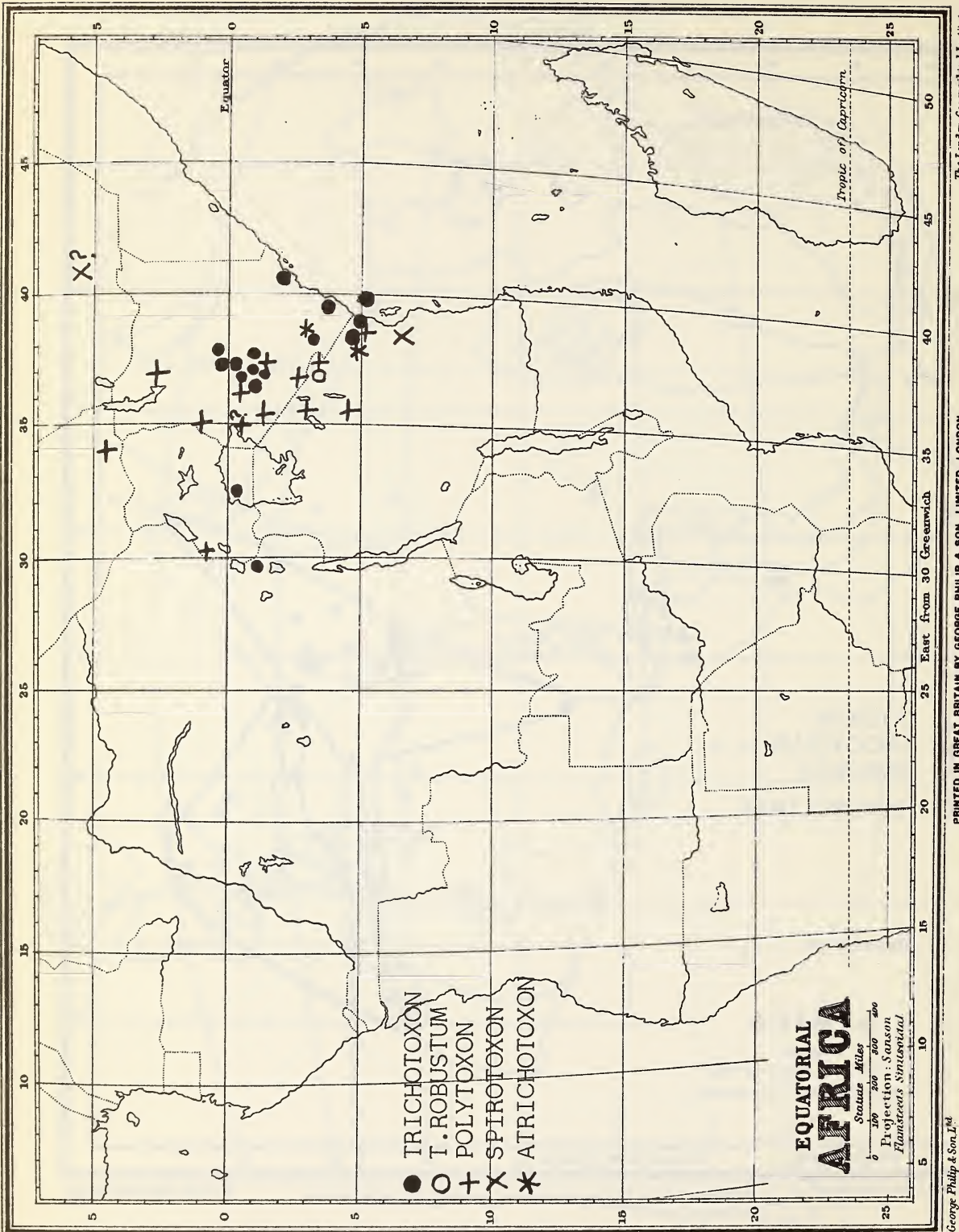
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Fig. 13 Slug distribution

# East African Slugs



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Fig. 14 Slug distribution

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## TWO INTERESTING PLANT RECORDS FROM EAST AFRICA

By

B. VERDCOURT

## 1. An Interesting Fern Record From Kenya

The genus Adiantum L. is known to most people interested in plants since it contains the familiar Maidenhair fern (Adiantum capillus-veneris L.). Eight other species, including two escapes, are now recorded from East Africa.

In April 1959, Mr. Terence Adamson, who has collected many interesting plants in the Northern Frontier Province of Kenya, found a fern on a steep cliff on Mt. Kulal, which is to the east of the southern end of Lake Rudolf. He brought a few fronds to the herbarium where Mr. Newbould immediately recognised it as something exciting and identified it as Adiantum reniforme L. var. asarifolium Willd. Material was later collected on Marsabit. I have also heard that it had previously been found there by another collector but no specimens were presented to the herbarium; Kew were also unaware that the plant had been found in Kenya. Until someone claims to the contrary, and presents evidence, Mr. Adamson's record is considered to be the first. Prof. R.E.G. Pichi-Sermolli does not mention the species in his excellent and beautifully illustrated account of the species of Adiantum occurring in north east Africa (*Adumbratio Florae Aethiopicae* 5. Parkeriaceae, Adiantaceae, Vittariaceae (1957)). A figure based on T. Adamson's Marsabit specimen has kindly been drawn by Mrs. E.J. Brown (Fig. 1)

This record is of extreme interest. Typical Adiantum reniforme occurs in Madeira, the Canary Islands and the Cape Verde Islands. Adiantum reniforme L. var. asarifolium Willd. is recorded from Mauritius and Réunion (Bourbon) and Adiantum reniforme L. var. crenatum Bak. from Madagascar. There are two other records from continental Africa, both a little dubious, though why I do not know, since the plant is utterly unmistakeable. The Rev. J. Buchanan is said to have gathered some barren fronds by a spring on the Drakensberg mountains (T.R. Sim, *The Ferns of South Africa*, p. 241, t. 118 (1915)). Kuhn in his *Filices Africanae* (1868) records it doubtfully from Senegambia. Even if these records are accurate, the occurrence of this plant in Kenya is still somewhat of a remarkable discovery. They may indicate a relict distribution, or a possible explanation might lie in the fact that spores have been carried by birds. The flora of Marsabit and Kulal is not at all peculiar, being closely similar to that occurring at similar altitudes in the Central Province of Kenya. The distribution is mapped in Fig. 2.

The actual validity of the varieties needs careful investigation. Christiansen (*Cat. Pterid. Madagascar*, 51 (1931)) does not uphold the variety crenatum; incidentally he records both the typical variety and var. asarifolium from Madagascar. Hooker and Baker (*Synopsis Filicum*, 114 (1867)) distinguish the var. asarifolium as follows - stems stronger, 6-12 in. long (not 4-6 in.), frond 2-4 in. broad (not 1.5-2.5 in. broad) with a deep narrow sinus (not a broad open sinus).



## Plant Records

The sheets available for study in Nairobi are cited below.

KENYA. Northern Frontier Province. Mt. Kulal, growing in small tufts on a cliff, at about 7000 ft. alt., April 1959, T. Adamson in EAH 11649 (EA); Marsabit, July 1959, T. Adamson in EAH 11691 (EA), and same locality, Gof Sokorte-dika, south wall, on sheer cliff in forest, spring at foot of cliff, 18th Aug. 1959, J.A. Wood 100 (EA).

In order to make this note as useful as possible the other species of Adiantum recorded from East Africa are keyed out below and portions of fronds are figured in fig. 3 for which I am also indebted to Mrs. E.J. Brown.

1. Fronds simple, reniform.  
(Kenya: Marsabit, Kulal)..... Adiantum reniforme L.
1. Fronds variously pinnate,  
never simple..... 2
2. Fronds subpalmately divided into  
several pinnate pinnae, stems hairy  
(Kilimanjaro, W. Usambaras)..... Adiantum hispidulum Sw.
2. Fronds once to thrice pinnate..... 3
3. Fronds simply pinnate..... 4
3. Fronds twice or more pinnate..... 6
4. Rhachis glabrous, pinnules about twice as  
long as broad, on quite long delicate  
stalks (Tanganyika: Kiberege, Tunduru,  
Tendaguru and Lindi)..... Adiantum philippense L.
4. Rhachis hairy, pinnules more shortly  
stalked or sessile..... 5
5. Pinnules not deeply incised  
(E. Usambaras, Amani - seemingly  
rare\*, only one specimen in the  
E.A. Herbarium)..... Adiantum confine Fee
5. Pinnules deeply incised; fronds  
often rooting at the tips if they  
touch the ground (Uganda: Murchison  
Falls, Lake Albert scarp; Kenya:  
Thika, Emali, Chyulus, Moyale;  
Tanganyika: Amboni, Amani, W. Usambaras,  
Pares, Marangu; Zanzibar) (Sometimes  
misidentified with the oriental  
Adiantum caudatum L.)..... Adiantum incisum Forsk.

---

\* A. Peter appears to have collected about a dozen specimens in the East Usambaras.

6. Pinnules small, 7-10 mm. long and 3.5-10 mm. wide, strongly cuneate at the base, slightly incised at the apex; sori round or kidney-shaped (A delicate fern with numerous small pinnules; a tropical American species now commonly naturalised on banks at Amani, Tanganyika).....Adiantum cuneatum Langsd.& Fisch.
6. Pinnules larger, sori oblong, square, curved-oblong or reniform.....7
7. Pinnules usually smaller, rounded to cuneate at the base, not so deeply incised, usually regularly crenate, 5-14 mm. long and 6-15 mm. wide, breaking off at maturity and leaving a short stalk; sori rounded-oblong or reniform (Uganda: Moroto, Elgon; Kenya: Chyulus, Mt. Kenya, S. Kinangop, Mau, Elgon, Mt. Kulal; Tanganyika: Kilimanjaro, Meru, Monduli, Hanang, Kigoma) (This has been usually misidentified with Adiantum poiiretii Wikstr.).....Adiantum thalictroides Willd.
7. Pinnules usually larger, rounded to strongly cuneate at the base, slightly to very deeply incised, 8-22 mm. long and 6-22 mm. wide, persistent at maturity; sori approximately oblong or square, not curved (Kenya: Chyulus, Mbololo, Nairobi, Thika Gorges, Kedong Valley, Mau, S. Kinangop; Tanganyika: Kilimanjaro, Crater Highlands, Pares, Mpwapa.).....Adiantum capillus-veneris L.

There is a single specimen of Adiantum weigandii Moore in the East African Herbarium collected by Mrs. Moreau at Amani and kindly determined by Mr. F. Ballard of Kew. This is not an African species and, since there is no data with it and it was perhaps collected in the little fern house once maintained at Amani, it has been omitted from the key. It resembles Adiantum capillus-veneris L. in its deeply incised, cuneate pinnules about 1.5 cm. long and broad but the sori are round or kidney-shaped.

Addendum. A. Peter (Flora von Deutsch-Ostafrika 1, 43-45 and Anhang 4, t.5, f.1 (1929)) describes two species of Adiantum from Tanganyika, namely A. pedatum A. Peter, the description and figure of which indicate that it is close to A. hispidulum Sw. but has larger pinnules and is not hairy; and A. alatum

A. Peter, which from the description (no figure is given) is closely allied to A. philippense L. but has winged rhachides and shorter, winged petioles. Since so many of Peter's species are superfluous and no material in the herbarium can be referred to either of them I have omitted them from the key.

2. Monanthotaxis poggei Engl. & Diels (Annonaceae);

A New Generic Record For East Africa

The western affinities of the forest flora of the Lake Province of Tanganyika and adjacent parts of Uganda are emphasised nearly every time a collection from that area is received for naming.

In several small collections sent in for naming by Miss V.J. Morris-Goodall and Mrs. M. Morris-Goodall, who are carrying out researches into the habits of Chimpanzees in the Kigoma area of western Tanganyika, three specimens of an unfamiliar Annonacea were discovered. With the aid of Boutique's keys in Flora Congo Belge this was readily identified as Monanthotaxis poggei Engl. & Diels, a species represented in the East African Herbarium by two sheets from the Congo, comparison with which left no doubt as to its identity. Apart from the Congo, where it is widespread, but local, in the equatorial forest, only one other very recently recorded occurrence in Angola could be found in the literature. The distribution of the tree is shown in Fig. 5. Rosette Fernandes gives a photograph of the Angolan specimen collected by Gossweiler and through the kindness of Mrs. Church I have been able to include a drawing giving fuller details (Fig. 4). The tree is well characterised by the silvery adpressed hairs beneath the leaves and the small flowers with six valvate petals. Details of the specimens are given below; unfortunately all are unicates and are represented only in the East African Herbarium, Nairobi.

Monanthotaxis poggei Engl. et Diels in Engl., Monogr. Afr. Pflanzen-fam., 6, 53 (1901); Boutique in Fl. Congo Belge 2, 373 (1951); R. Fernandes in Garcia de Orta 6, 673-677, t.1 (1958).

TANGANYIKA. Western Province, Gombe Stream Chimpanzee reserve, north of Kigoma, 1960, Mrs. M. Morris-Goodall 59 (EA), and same locality, Jan. 1961, Miss V.J. Morris-Goodall 6 (EA): small tree, flowers rather fleshy, yellowish, and same locality, in 'miombo woodland', 11 March 1961, Miss V.J. Morris-Goodall 30 (EA): shrub with small green fruits.

(Received 21st November 1961)



## TWO INTERESTING PLANT RECORDS FROM EAST AFRICA

### Explanation of Figures

- Fig.1     Adiantum reniforme L. var. asarifolium Willd.  
Kenya, Mt. Kulal, T. Adamson. (Sori enlarged).
- Fig.2     Distribution of Adiantum reniforme L.
- Fig.3     Adiantum species; fronds and sori.
- a. Adiantum confine Fée. Drawn from Warnecke 473.
  - b. Adiantum incisum Forsk. Drawn from Meinertzhagen 9472.
  - c. Adiantum capillus-veneris L. Drawn from Gillett 14881.
  - d. Adiantum cuneatum Langsd. & Fisch. Drawn from  
Verdcourt 276.
  - e. Adiantum hispidulum Sw. Drawn from Molesworth-Allen 3613.
  - f. Adiantum thalictroides Willd. Drawn from Hedburg 65.
  - g. Adiantum philippense L. Drawn from Schlieben 6035.
- Fig.4     Monanthotaxis poggei Engl. & Diels.
- a. Fruiting branch, x 2/3.
  - b. Flower, x 6.
  - c. Part of corolla, x 8.
  - d. Sepal, x 8.
  - e. Carpels, x 20.
  - f. Stamen, x 20.
- Fig.5     Distribution of Monanthotaxis poggei Engl. & Diels.

Plant Records



Fig. 1 Adiantum reniforme L.

# Plant Records

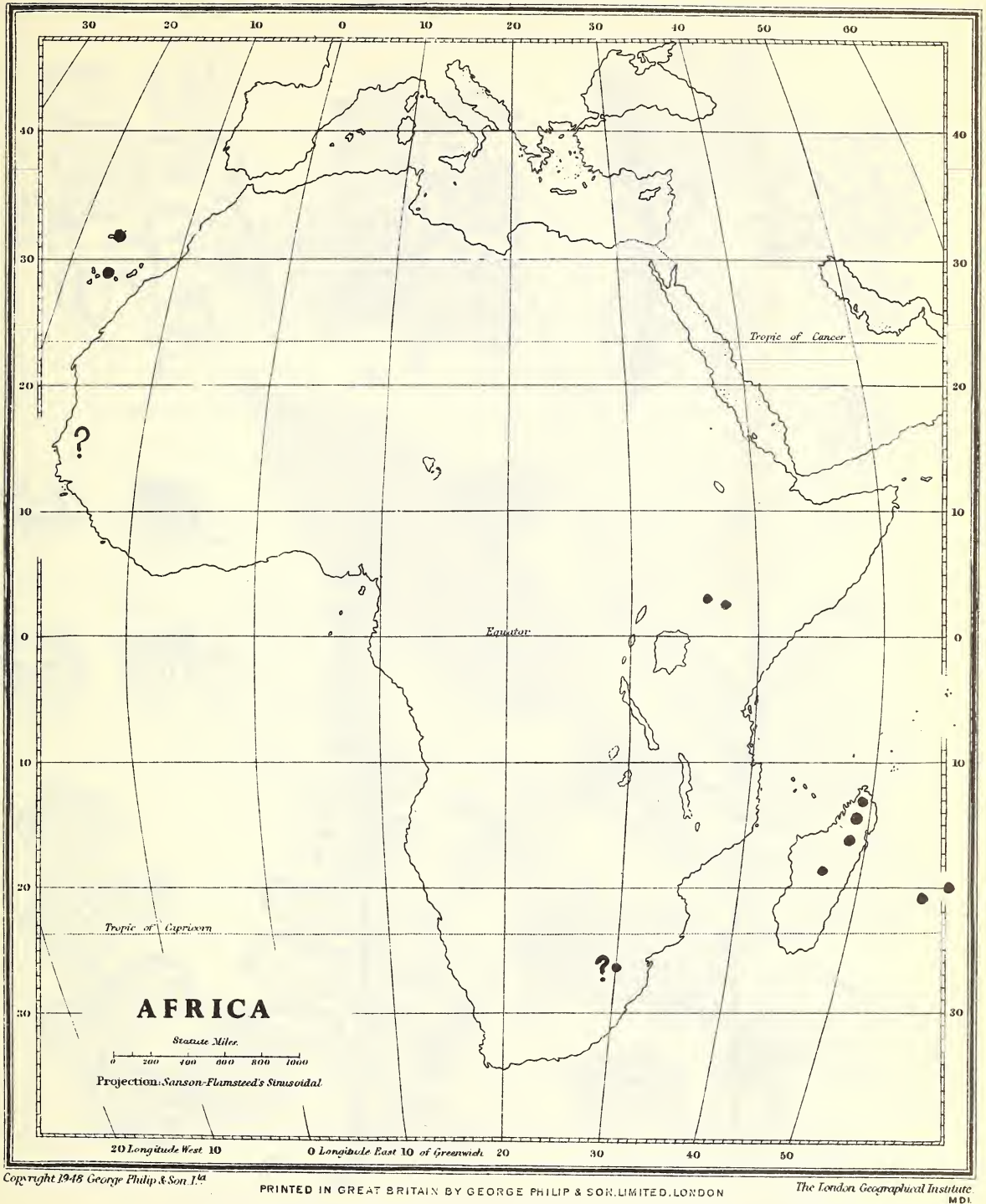


Fig. 2 Distribution of *Adiantum reniforme* L.



# Plant Records

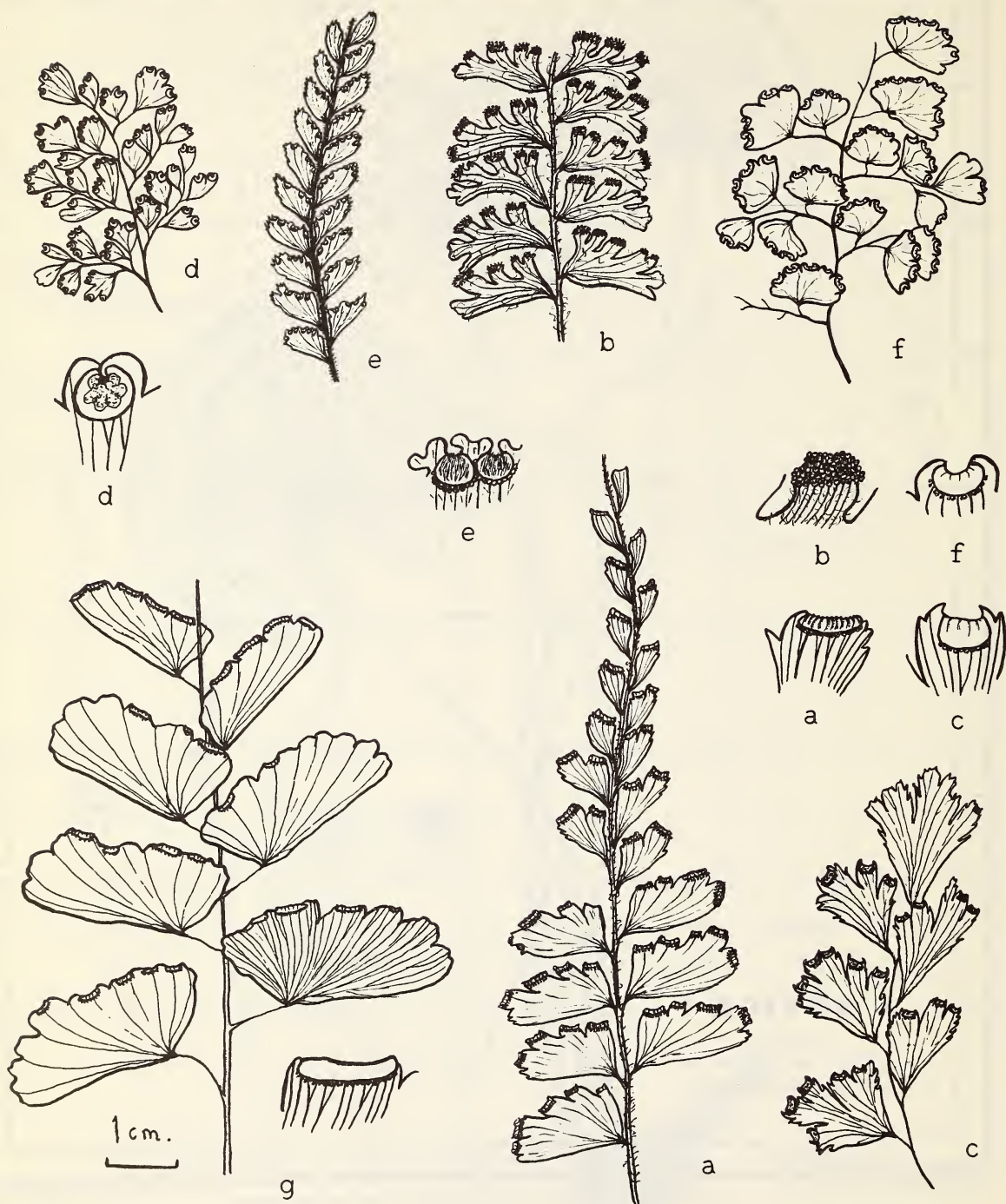
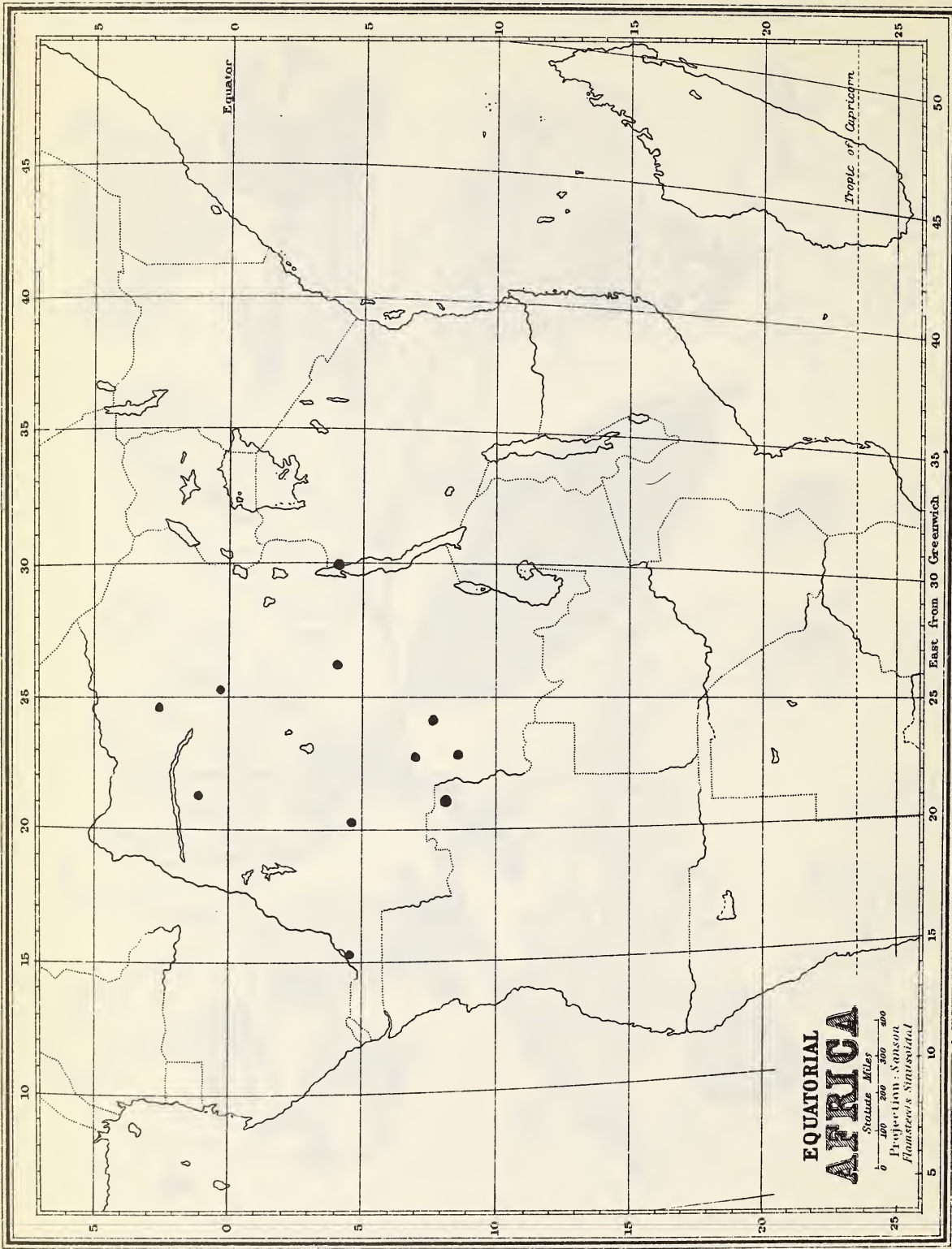


Fig. 3 Adiantum species



Fig. 4 *Monanthotaxis poggei* Engl. & Diels

# Plant Records



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Fig. 5 Distribution of *Monanthotaxis poggei* Engl. & Diels



## NOTES ON THE MIGRATION AND DISPERSAL OF BIRDS AT KITUI

By

J.R.M. TENNENT

Kitui Township lies eighty two miles practically due East of Nairobi. Two miles beyond the town the rolling plains which stretch eastwards from the Ukambani hills at an altitude of between 3,700 and 4,000 feet are broken off by a fault scarp running from North to South. The ground drops precipitously through hilly country for over a thousand feet into the desert bush which extends almost unbroken to the coast. Kitui is thus situated on the brink of the high plateau of Kenya. The escarpment hills produce orographic rain and Kitui is placed in a marked rain belt surrounded on both East and West by areas having only between 15 and 30 inches of rain. The onset of the October rains is violent and within a month the countryside is transformed from its state of four month old dessication. The bare trees take on heavy foliage and dense undergrowth and grasses develop. The rains tail off towards the year's end, but sporadic rain begins again in March and there is no second dry season to compare with that from May until October.

In ten months spent in Kitui from 1st.July, 1960 until 12th. April, 1961 the writer kept day by day records of the species of birds present in the Township and the results are shown on the accompanying charts. Fig. 1 shows the palaearctic migrants (the migrating Alpine Swifts, Apus melba (Linn.) were not identified as to race). Besides showing the wide range between the dates of the earliest and latest arrivals this chart also shows that some species are passage migrants and of these some pass apparently in one direction only, though as visible migration was not seen, local movements may be involved. In this chart, as in the others, the relative abundance is roughly indicated by the use of a broken line to show that the species was present but only in small numbers.

Fig. 2 shows two groups of species which are resident in tropical Africa. Group 'A' were present for the greater part of the period of observations but temporarily disappeared, whereas group 'B' only appeared temporarily. The movement of these species seemed to be clearly related to the rainy season. Of those which disappeared from Kitui about the onset of the rains four were noted as returning accompanied by juveniles and a possible explanation of their disappearance is that they moved into the hot lower country to breed during the brief wet season, moving back into the rain belt gradually as the country dried up and food supplies decreased. Of the seven species which appeared in Kitui at or soon after the onset of the rains, it will be noted that five were cuckoos.

Fig. 3 shows a group of species showing no common features in their times of appearance. The appearance of the Crested Francolin, Francolinus sephaena grantii Hartlaub and the Spotted Thicknee, Burhinus capensis (Lichtenstein), both abundant in the lower country East of Kitui, raises interesting questions as to the nature of the local movements involved. The Mottled-throated Spinetail, Telacanthura ussheri stictilaema (Reichenow), about the movements

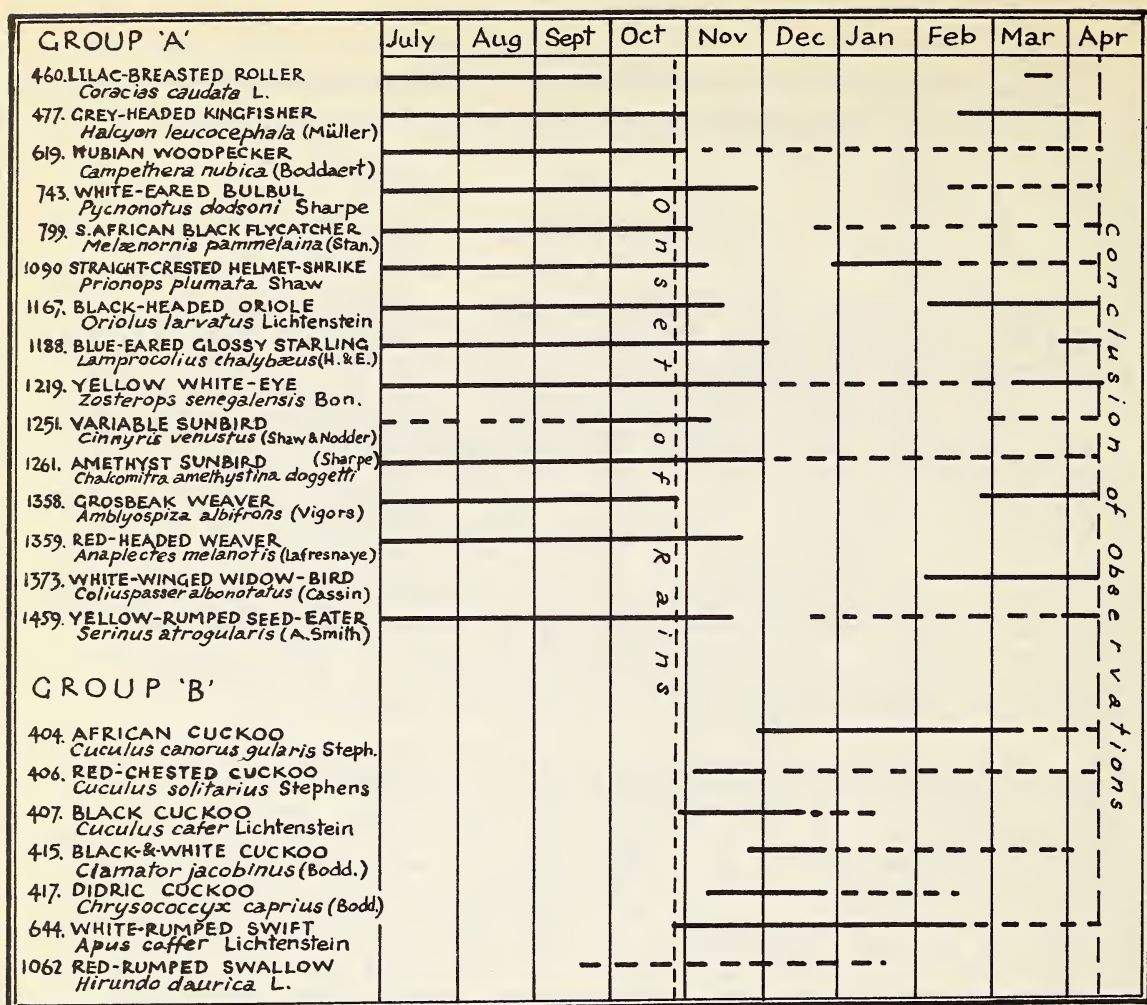


Fig.2

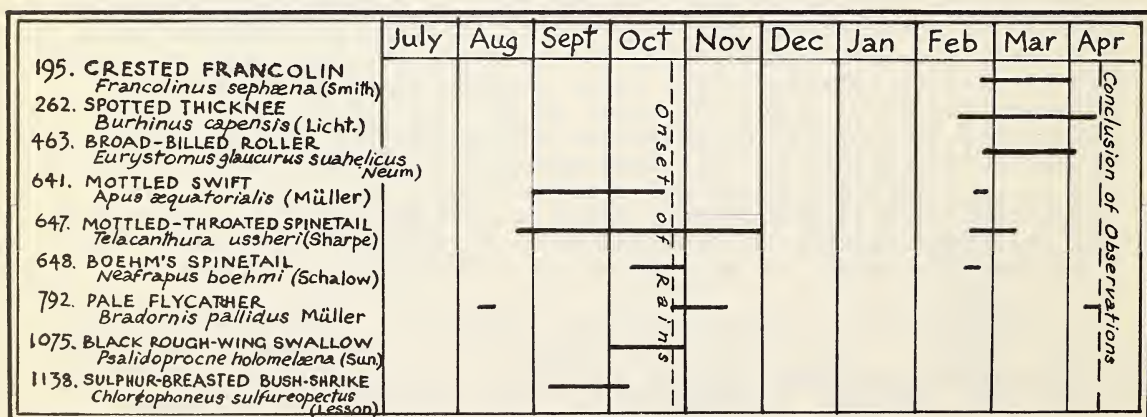


Fig.3

# Bird Migration at Kitui

of which little is known, was represented by a number of birds which gradually increased from two in late August to eight by mid-October. Nothing was seen to suggest breeding. Of Boehm's Spinetail, Neafrapus boehmi (Schalow) only one was ever seen at any one time.

In sum the charts raise more questions than they answer but could provide a useful basis for comparison with similar observations in other areas. Of particular value for comparison would be details of movements in an area lying in the desert scrub belt between the Highlands and the coastal region.

(Received 28th. August 1961)

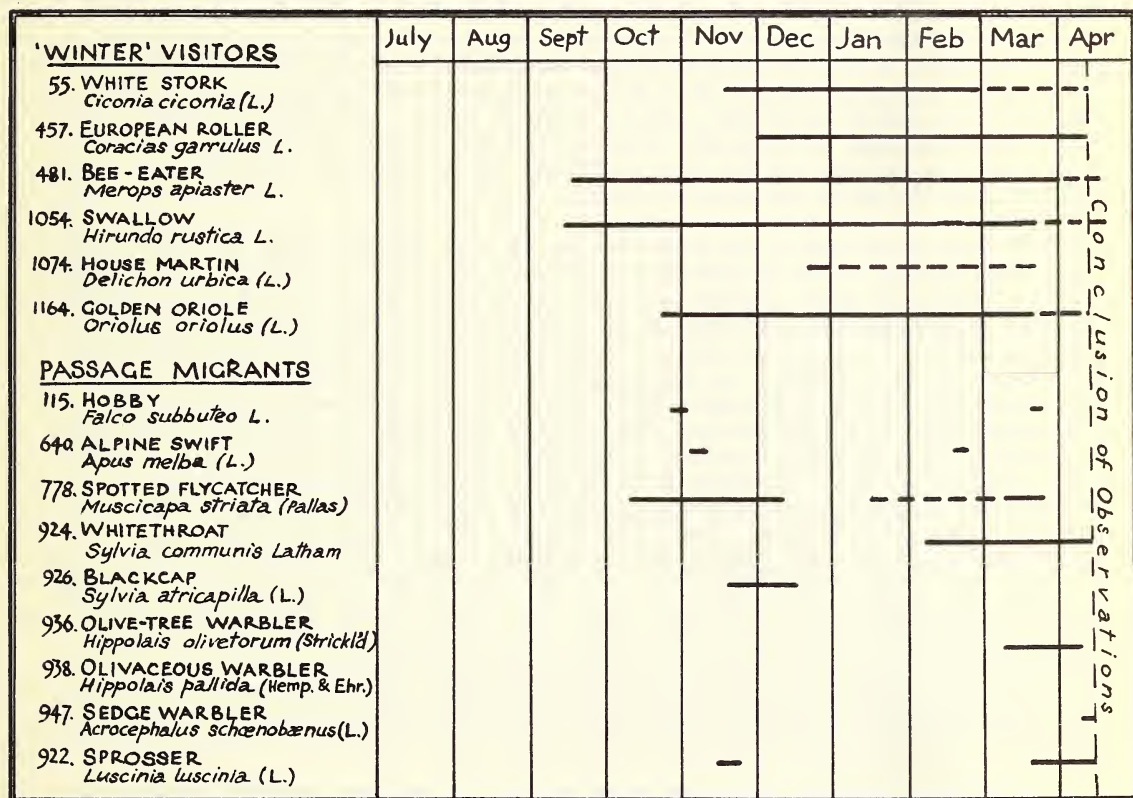


Fig.1



## BAU PETROGLYPHS

By

A. T. Matson.

The location and distribution of bau boards carved on rocks might provide some valuable clues to the areas occupied or grazed over by the early inhabitants of Kenya. These petroglyphs might also throw some light on the obscure and confused picture of tribal migrations, before the Highlands were penetrated by Arab slave and ivory caravans or settled by Europeans.

The game itself is of very ancient origin, as it is recorded in Egypt as early as the Empire Age (1580-1150 B.C.) Except in the extreme north, it is known almost throughout Africa, while it is played throughout the Near and Middle East and in India, Ceylon, Indonesia, the Philippines and America. It is thought that the game spread from Arabia, with a secondary focus for Africa in the Sudan and possibly on the East Coast seaboard. It is natural that with so wide a distribution there are many variations in equipment and technique, which may have an important bearing on tribal affinities and migrations. As a general rule, the Bantu tribes of East and Central Africa use the four line board, while in some of the regions inhabited by the pastoral Nilo-Hamitic peoples the two line board is more generally found.

In areas occupied at present or in the recent past by the Kalenjin group of Nilo-Hamites, petroglyph boards have been reported in Sebei, Elgeyo, Tugen, Nyangori and Nandi country. All members of the group share a common name for the game, kechuiek, and the association of the game with a particular locality is perpetuated in place names, Kechui or Kapkechui. There are several such names in Nandi, although in some cases none of the present inhabitants can remember the particular spot where the game was traditionally played. Although these place names occur throughout Nandi, by far the largest number of them are found in the south-west, which is generally regarded as being the area originally settled by the tribe after their migration from Elgon. It is surprising that Huntingford lists Kapkechui as a kokwet tree, under which the social and judicial affairs of the surrounding country were settled. He is presumably referring to the fig tree in the Kapkechui koret near the Baraton Veterinary Centre. No stone board is to be found near the tree, which is in an area devoid of rocky outcrops, but the local tradition is that just before the turn of the century the Kablelach age group used to play in the shade of the tree on a four line board scooped out of the earth.

In three places in south-west Nandi there are boards carved on the surface of large, flattish rocks of granite or gneiss. Six similar petroglyphs have been recorded and there may be others, which have now been forgotten or which have either become covered with vegetation and debris, or weathered away beyond recognition. The best example is in a sheltered position at Chumbiri, - (the name is said to mean a place surrounded on all sides with steep banks) - in the Cheptinwich koret, which is situated a little to

the north-east of Serem Market and to the south-east of Kaimosi Mission, (Fig. 1). The holes have been carved on a granite outcrop a few feet away from a large salt lick, where no doubt the warriors beguiled the hours playing on the warm rock, while they awaited their turn at the lick. The board consists of twentyfour holes arranged in two lines of twelve holes each. The lines are carved on a slight arc and on a gentle slope, so that the top holes are two or three inches above the bottom ones. Some of the holes are elliptical and some are round; some have very clear cut, sharp edges but others are very worn. The largest hole is 83 mm. long, 46 mm. wide and 29 mm. deep; the smallest is 40 mm. long, 30 mm. wide and faintly scooped out of the rock. On the same exposed surface are what appear to be other attempts to make a similar board. These may have been abandoned by imitators, when they found they could not produce a board resembling the model they were copying, or perhaps they were given up, because of faults which developed during the execution of the work, by the same people who made the full scale board.

Another two line petroglyph board with twentyfour holes is to be found near the Nandi Escarpment to the east of, and below, Kikirige Hill, which is better known as the Nandi Rock or by its Luo name of Godjajüok, (Fig. 2). The holes at this site are rounder and much more worn than those at Chumbiri, presumably because the rock is much more exposed or because the board was more often used. The petroglyph is on a small rocky hillock, so situated that the warriors seated around it could observe both the stock grazing below them to the north and east, and also keep in touch with the look out man posted on the Nandi Rock to watch the plains below the south escarpment. It is likely that groups of warriors would assemble here more often than at the Chumbiri salt lick, to which stock would be driven at intervals of a fortnight or more. An interesting feature of this site is that, alongside the well made, evenly spaced two lines of holes, an attempt has been made to make a further two lines so as to convert the board to the four line pattern. The completed holes are large, badly finished and unevenly spaced, but the imitators abandoned their work before a complete board was made. At the present time, the petroglyph is not used by the local people, who have made their own four line board in the earth under a shady tree on the same hillock.

A third board has been carved on a rock below the Chemnaria Hill in south-west Nandi. This one, which is more roughly made than the other two, was either originally scooped out very faintly or it has become badly worn with the passage of time. It was completely hidden by vegetation when inspected by the writer.

Although there is insufficient information about petroglyph boards in other Kalenjin areas to allow of description or discussion, one example studied in Nyangori is of interest as it differs from those described in Nandi. The board is situated in a commanding position at Chemugong, east of Kapkerer Market and north of the Central Nyanza border. It covers an area of thirty by ten inches and is made up of 48 holes spaced equally over four lines. As the large rock on which the board is carved has been used for many years as a crushing base for cassava, the holes are so worn that they can no longer be used for their original purpose. An old



woman of about seventy years stated that the board was in use when she was a young girl and was there many years before she was born. As far as can be judged from its worn state, the Chemugong board was originally executed as a four line board and, as such, it is the only one of its kind to be recorded in areas now occupied by Nilo-Hamites. Four line petroglyphs have been described in the Bantu occupied areas of Uganda and Tanganyika, and it may be that this apparent exception from a Nilo-Hamitic country was the work of the Bantu to the west, many of whom were recruited as mercenaries by the Nyangori during their wars with the Nandi.

Some information on kechuiek in Nandi can be gleaned from the early writers, some of whom mention the game as a tribal pastime. In 1902 Hobley noted: "The children play a sort of komari or bau with stones moved about among a number of small depressions in the ground: there are usually three rows of six such depressions in a row." It is difficult to understand the reference to three rows, a form which has been recorded only from Abyssinia, unless the tribal players were then in the process of changing over from the two to the four line game. It must be remembered, however, that Hobley had much less opportunity for observing the Nandi in their work and play than he had with their more peaceful and friendly Nyanza neighbours, and that when he travelled in Nandi there were always more important and urgent matters to claim his attention.

The implication that the Nandi did not go to the trouble of making wooden boards is corroborated by Hollis, who makes no mention of such boards in his very full catalogue of articles used by the tribe. He notes: "The almost universal game of bau is known, and is sometimes played by grown up people, but they do not use a board containing compartments like the Bantu tribes. Instead of this they make holes in the earth in which they circulate seeds. This game the Nandi call kechuiek. As the Nandi had none of the wooden boards often described by travellers among the agricultural tribes, it is probable that the very few boards in use in Nandi to-day have been imported in comparatively recent times by Nandi returning home from service and travels outside the district.

The attitude of the Nandi to the game is typical of their mental make up, while their views on the origin of the petroglyphs illustrate their theories on the history of the Nandi Plateau. The elders say it was never a popular game with them or the warriors, as there were always much more important matters to claim their time or engross their thoughts. The younger men were fully occupied with military training in planning and executing raids, while the elders who were too old to go raiding sought solace and recreation round the social beer pot, and in looking at and discussing the cattle they and their warrior sons had accumulated. Women never indulged in kechuiek as they had no time to spare from their arduous household duties. Although the children amused themselves with a variety of games, most of these had been designed not merely to pass the time, but rather to teach the coming generation to take its part in tribal life. As the majority of children's games made a direct appeal to the martial aggressiveness of the tribe, renown in these manly exercises was more sought after than any glory to be gained from proficiency in the art of circulating pebbles or sodom apple fruits among depressions



in the ground. Altogether the inference is made that the Nandi, who have to a high degree the pastoral propensity for achieving contentment while doing nothing, consider that such a trifling game as kechuiek would only appeal to people with very limited personal resources. It is not played regularly in the district even to-day, and the few who indulge in an occasional game are generally men and women who have travelled to the towns as soldiers, policemen, ayahs and so on.

Dorobo comment on the game, which has been recorded by Marker, has much in common with that of the Nandi: "We do not play as for the sake of the game we should forget to go hunting, and then we should have to go hungry with our families".

It is said that the Masai have come to identify the game with their preoccupation with stock, so that it is now regarded as a symbolic fight for cattle, in which the winner must take all his opponent's stock and instal them in his own kraal. The Nandi do not share this imaginative conception of a game, which to them is merely a somewhat unprofitable way of passing the time. In some respects this attitude is surprising as sodom apple fruits, which are often used instead of pebbles in kechuiek, play an important part in several Nandi rites, have been accorded the name of 'cattle of the sodom apple', (tugap labotuet), and are used to represent stock in children's games. There is also no suspicion, such as disquieted the early missionaries in Uganda, that kechuiek is played as a gambling game by the Nandi. Unlike some Uganda peoples, the Nandi do not consider a player's prowess at kechuiek indicative of his ability to settle disputes, nor that the petroglyphs play any part in rainmaking activities.

The Nandi have no very clear opinion as to who might have made the petroglyphs, but they are certain they are not the work of their ancestors. The nearest guess they can hazard is the one they make to all questions about the past which are now beyond their knowledge: 'It might have been the Sirikwa, or the Masai'. Similarly on the age of the petroglyphs, the invariable reply is: 'They have always been here.' Not only have the elders no idea how the holes were carved on the rocks, but even young men, who have travelled away from Nandi, can offer no intelligent guess as to the implement used or the technique employed. The old men say they have never seen the game played in any other way than on the four line board used by Nandi players to-day. As the petroglyph boards are all of the two line type, this seems to confirm the elders opinion that they are the work of another tribe. The rather amateur attempt to convert the Kikirige board from the two to the four line type may have been made by a Nandi warrior, who strove to copy the model before him, although the carving operation demanded a technique he had failed to master. The Baganda, when they make a board on soft sandstone, start the holes by sharp jabs with a hard, pointed stone and widen and deepen them by a rotatory movement with the same implement. It is uncertain whether this method, which allows a board to be made in an hour, would be successful with the harder rocks of the Nandi Plateau.

If the Nandi view that the boards were not made by ancestors of the tribe is accepted, the identity of the makers remains a

subject for hypothesis and conjecture. As it is generally accepted that the Nandi have lived in the south-west of the district since about the seventeenth, or at the latest the eighteenth century, the inference might be drawn that the petroglyphs were made before this time. To a layman's eye this does not seem possible, as the weathering of the holes is not consistent with exposure to the elements for as long as two or three centuries. The position of the boards adjoining a salt lick, overlooking grazing grounds and in touch with one of the tribal frontiers and cattle raiding areas suggests that the game was played to while away the time, when warriors were engaged on pursuits connected with the family herds. Before the Nandi climbed the south escarpment and occupied the rocky south west part of the district, it seems unlikely that cattle would have been herded in this area by another tribe. The nomad pastoralists, who wandered from time to time over the present northern grazing grounds of the Nandi, had ample pasture and sufficient salt licks on the plains, so that there was no reason why they should use the difficult, broken country across the Kibos Gorge.

The Sirikwa theory is especially interesting in view of the stone workmanship associated with the enclosures said to have been constructed by this tribe. The sites of the petroglyphs, however, are in areas where there are few, if any, of the traditional types of Sirikwa remains. Huntingford, who admittedly was more conversant with the north than the south of the district, has catalogued the probable Sirikwa antiquities, the large majority of which are in the northern and central parts of the country. No petroglyph is listed in his catalogue, and the only record of such a board in northern Nandi is that described by Mrs. Eve Bache, on her farm in Turbo district, as "a permanent Intoto board on the top of a great granite hill", which is called 'The Pig' on the Ordinance Map and which overlooks the Murugusi River. This board was of "twenty-four holes, side by side, in two lines of twelve, hollowed out in the granite in shallow cups". She infers that the game was played by the Masai on the farm, who were working there as herds. Although the farm has a Masai name, Olamusogai, the granite hill was an important look out post for Nandi warriors covering the Kipkarren Ford. Knowledge of the distribution of petroglyphs and of the origin and migrations of the Sirikwa is admittedly scanty, but it is doubtful if the makers of the earth and stone enclosures were also the carvers of the petroglyph boards.

The suggestion that the petroglyphs were the work of the Masai would also seem doubtful, since (with the exception of the Turbo specimen) the boards so far located are outside the area known to have been grazed over by this tribe. As the Masai play the two line game and are known, within recent times, to have made similar boards to those found in south west Nandi, it is conceivable that the Nandi specimens might have been carved by the Nilo-Hamitic precursors of both the Kalenjin and Masai groups. The fact that the Nandi to-day play the four line while the Masai have retained the two line version does not discredit this theory entirely, as the game was more of a tradition with the Masai than with the Nandi, who were also more open to change from outside influences. The Nandi carvings might possibly have been executed by immigrants to the district, who brought with them the game



they played in their homelands. But most of the tribes who provided the Nandi with recruits were either relatives, such as the Kipsigis, Geyo, Suk and Tugen, or Bantu, all of whom now play the four line game. The only peoples who might have played the two line game at the time they were assimilated with the Nandi were the Sirikwa and the Uasin Gishu Masai. Another conjecture is that they may have been the work of captured Masai, who sought consolation in the game while awaiting ransom. This would date the boards from about 1880 onwards, when the Nandi first began consistently to get the better of their traditional enemies, and would bring them within the period when work so strange and new to the Nandi would have been remembered by those who watched its execution. Finally, Wayland describes the Nubian game as being the two line variety, but with eight holes to each line. Although Nubian soldiers were stationed in Nandi almost permanently from 1895 to 1906, and ex soldiers were settled there towards the end of this period, none of the petroglyphs is very near any of the known K.A.R. camps or settlement villages. If the soldiers had played on boards they had carved for themselves on rocks, they would have been seen by the Nandi, who were ever watchful of the activities of the military, and the memory would have come down over the short space of sixty years.

Kapkechui very occasionally occurs as a personal name. When this is given as a nickname to an adult, it can be inferred that the recipient was an adept performer of the game. When given to a boy, it would indicate either that the child was born near one of the places where kechuiek is played or, more likely, that he was born while his father was playing a quiet game with a friend to take his mind off the coming event.

There is more information in the early literature about the Masai version of kechuiek, from which it is evident that as a tribe they were more addicted to the game than were the Nandi. In 1904 Hollis recorded: "The old men likewise have their game. This is played on a board containing many compartments, in which they circulate pebbles called n-doto. This game is called en-geshei. The warriors also play this game, but they do not care about it much. They have no boards and make holes in the earth." Merker states the game was invented, when he was an old man, by Sindilo, the son of Maitumbe and Ngaiterob, who is said to have been the first woman. This legend ascribes a most illustrious origin to the game, and suggests that en dodoi might be considered as the traditional tribal pastime of the Masai. Merker describes the Masai board as being the two line type, with three to five holes in each line. This form of the game is never played by women and only seldom by warriors, who prefer another version, called en gehe, in which pebbles or fruits are manipulated in turn by eight or more players in the forty to fifty holes in each of the two lines. This form, which is never played on boards but with hollows scooped in the ground, has evidently been developed to cater for groups of warriors when out with the herds or on picket duty. Merker also notes that the el Gargures section, who lived in an absolutely flat country, made a mound with earth and stones, on which a few sentries watched the herds and played en dodoi on a hollowed out rock to while away the time. In Kenya, Llewelyn Powys records that when he was managing a Rift Valley farm in the Gilgil District during the 1914-18 war, he would



"listen to the Masai lying on a shaded rock, whose smooth surface still bore upon it certain symmetrical markings scratched out, perhaps centuries before, by some indolent progenitor of the herdsman for the quaint game of forest checkers played with smooth stones."

To sum up, there would seem to be some evidence that the two line game was played long ago by all the Nilo-Hamitic peoples, but that the Kalenjin branch changed to the four line version associated with the coast and those inland Bantu tribes who were unaffected by Masai influence. There appears to be no connection between the distribution of the petroglyphs and the known tribal migration and caravan routes, as only one somewhat doubtful specimen on the Nzoia crossing near Mumias has been recorded from near these routes. The balance of evidence is that the petroglyphs were the work of the Masai, who still make them and play on them, as boards have been found in places grazed over by the Masai as a tribe, occupied by them as a remnant or, in the case of the Mumias example, where they were employed as mercenaries. This tentative conclusion, however, does not provide a satisfactory explanation for the boards in south west Nandi, but these might have been executed by Nandi, who failed to pass on the technique to their successors, or they might be even older and represent the work of precursors of both the Kalenjin and Masai groups.

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(Received 4th. July 1961)

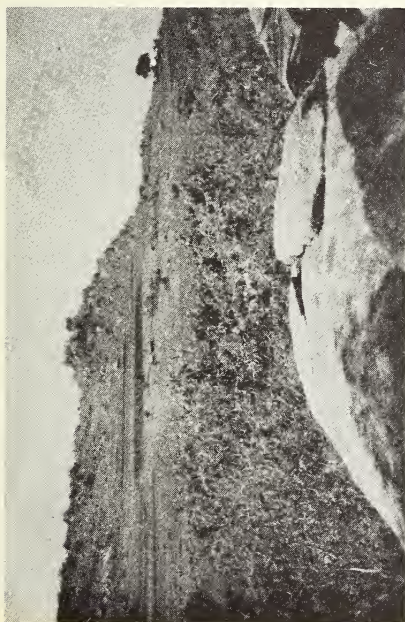
# BAU PETROGLYPHS



KIKIRIGE. (Fig. 2)



CHUMBIRI (Fig. I)







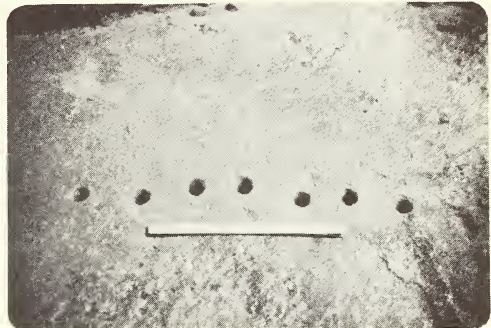
## BAU PETROGLYPHS



Hole near Lanet Petroglyph made by Masai to collect rainwater which was used in preparation of courage medicine by war bands. Marks made by spear butts clearly seen.

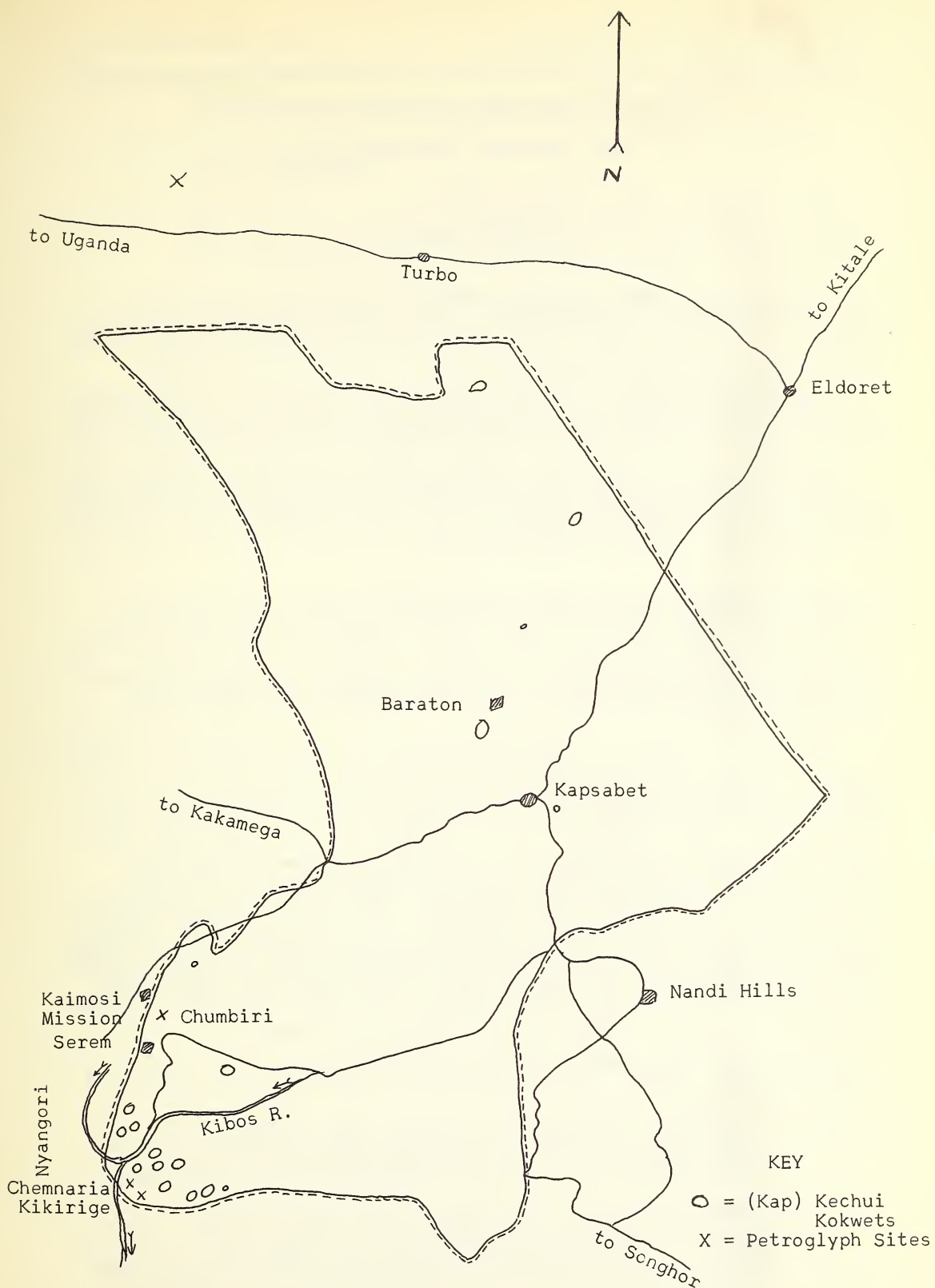


Petroglyph Bau boards on Nderit Estate, Lanet.



Petroglyph on Nzoia River, Mumias.





BAU PETROGLYPHS



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## NOTES ON SOME NEWLY-FOUND BAU PETROGLYPHS

### AND THE MASAI GAME "NGESHUI"

By

CLAUD HAMILTON

There is an incomplete Bau petroglyph on some rocks beside the Nzoia River. It is situated on the righthand bank a few yards downstream from the road bridge near Mumias Trading Centre, North Nyanza.

The board consists of seven holes in single line, of which numbers one and seven are shallow depressions, the remaining five being perfectly cylindrical and some two inches in depth.

The rock which bears the petroglyph is more or less horizontal and, from its smoothness and proximity to the river, has obviously been subject to frequent flooding. This may well be the reason for the board never having been completed.

An interesting point about this board is that it is in a district which has long been inhabited by Bantu tribes, whereas the Bau game is usually thought to have been restricted to the pastoralists. However, Mr. A.T. Matson points out that many of the Uasin Gishu Masai after being defeated by the Laikipiak and Nandi went to the Mumias District, so this board may well have been their handiwork.

There is a cluster of Bau petroglyphs on Nderit Estate, approximately  $\frac{3}{4}$  mile S.W. of Lanet Railway Station. They are on an outcrop of rock facing N. by E. on an exposed hillside where, as my Masai informant pointed out, the players could not be taken by surprise by their enemies. Local tradition has it that the K.A.R. camp at Lanet was once the site of a big manyatta of Laikipiak moran (it seems predestined for military occupation) and that these boards were used by the warriors. There are eleven boards or traces of boards cut into the rock, of which one is still in use. This board is particularly interesting as one can see that whereas the upper part of each hole was originally ground out with a spear butt, the depth has been appreciably increased by the continual friction of the playing stones. These, too, have been worn almost as smooth as river pebbles by use through the years.

All the boards consist of two rows of holes in the following combinations:-

- (I) The board still in use has 12 plus 12 holes. It is 37 inches long by  $6\frac{1}{2}$  inches in breadth, each hole being approximately 2 inches in diameter by  $1\frac{3}{4}$  inches deep;
- (II) This has 15 plus 15 holes. I was told that this was used for another game played only by the Masai - the Samburu also play "ngeshui". No one now knows how this game was played and my informant said that even the grandfathers of the present adult generation would

probably not have known the rules..

(III) and (IV) each have 7 plus 7 holes and were obviously never completed.

(V) Has 16 plus 16, having apparently been extended when the holes at one end became too shallow through erosion. The serviceable end of this board seemed to have been in fairly recent use, I was told probably by children.

The remaining boards are all incomplete and vary from 8 plus 8 holes to a mere trace of 1 plus 1.

There is another site on Nderit Estate comprising three boards. These are in a saddle between two hillocks approximately  $\frac{3}{4}$  mile S.W. of the Lion Hill Rifle Range butts. The best preserved of these three boards has 19 plus 19 holes in very straight lines. It is 59 inches long by 6 inches across. An interesting feature of this board is that a trough about 6 inches broad has been carved in the rock along one side of it. This apparently was where the players put the "men" taken in the game. One may perhaps contrast it with the depressions to hold the chips on 18th Century gambling tables.

The other two boards on this site each have 15 plus 15 holes and are much worn. They measure respectively 43 inches by 5 inches and 54 inches by 6 inches.

The middle-aged Samburu who showed me the above board said that, as a young man, he used to play on the end twelve holes of the 19 plus 19 board, but it obviously has not been used for some time as the whole site is much overgrown.

I am told that the Luo play a somewhat similar game called "Ajua" on boards with two rows of 8 holes each, each hole holding three stones.

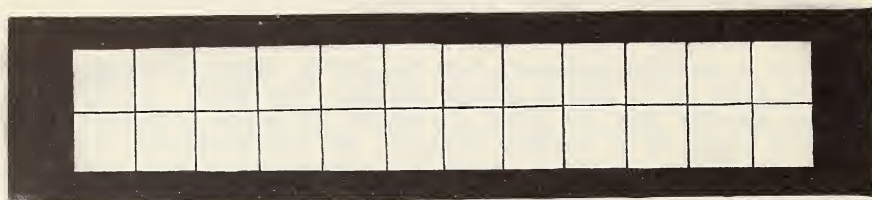
The Masai say that Nqeshui was invented by the widow of the first man - the Masai Adam. His name was Ole Dogoya ("The one ahead") and he lived at En Diggirr - high ground far from the present Masai country and probably to the North. Ole Dogoya's widow made the first Nqeshui board in the earth outside her hut hoping that men would come and play and that from among them she would be able to acquire a second husband.

In the old days it was the custom to use stones from the crop of an ostrich as playing-stones, but nowadays any round pebbles are used. To a certain extent these stones (ndoto) represent cattle to the Masai mind. For instance, when we would say: "Your move" to an opponent at draughts, the Nqeshui player says: "Drive away the stones" (terewa ndoto), and when he takes his opponent's men, he says: "I've got your cattle" (a-ata nqishu inono). When one player is well ahead of the other, the winning one will boast: "I have killed a young lioness"! (a-ata ol owuaru oibor, lit. - "I have a white wild beast"); to which the rejoinder is: "I have a brindled ox" (a-ata ol kiteng sambu). The winner of a game boastfully and inaccurately is apt to exclaim: "I've got 100 cattle"! (a-ata nqishu iip nabo), although in fact only 48 stones are used. The winner then says: "Move into a new house"!

(tamana!) meaning: "I'll give you your revenge".

On the other hand, when there are two stones together in a hole, these are called a sheep and when a player moves them he says: "Break the sheep" (tiqil enkerr). When putting the foremost of several stones into a hole a player says: "I rest here" (ka-irrag enne).

Before starting to play, the stones are arranged in the holes (ndotoi) in the following diagrammatic pattern:-



Taking the left-hand hole as No. 1, each player puts three stones into holes No. 2, 3, 5, 6, 8, 9, 11 and 12. The stones are always moved in an anti-clockwise direction. The following are some of the rules:

Player X starts the game by taking the three stones out of any hole on his side of the board, except holes No. 11 and 12, and placing them singly in any other three consecutive and occupied holes on his side, except No. 12, into which a stone can only be put when it is empty. Player Y then does the same on his side of the board.

The object of the game is to move one of your own stones into an empty hole on your side of the board opposite to a hole containing stones on the far side. You then take those stones, and they go out of circulation for good; but when several stones are moved only the foremost are "taken". The winner is he who takes all his opponent's stones. Fairly soon the stones on X's side move round to Y's side and they then become his to move. After a time when a number of stones have been taken and those on the board are more spread out, each player probably only moves single stones; these are only moved one hole at a time. When one of these is moved into a hole already occupied by one other stone a "sheep" is made and the player gets another turn immediately and has to "break the sheep" by moving one into the next hole and the other into the hole beyond that.

If the latter hole is already occupied by no matter how many stones, these are moved into say the first, second, third, and perhaps fourth holes; and if this fourth hole is also occupied, the process is repeated, one player having a number of consecutive moves until his foremost moving stone finds an empty hole or passes round to his opponent's side of the board.

As I have already said, the winner is the player who, by so moving the stones on his side of the board clears his opponent's side. Alternatively, if X is left with only one man in his hole



No. 12, and he has to move it into Y's No. 1, then Y is the winner. When each player is left with only one stone before the final result, this is known as "One-one" (obo-obo).

(Received 8th. September 1961)

#### LETTER TO THE EDITOR

Dear Sir,

##### Dragonfly Migrations

It might possibly interest your members to learn, that there was a migration of dragonflies about Christmas time which lasted the best part of a week. There were countless numbers moving about North-North West and we encountered them between here and Mombasa whilst motoring on the Malindi Road. They were orange in colour. Many settled around us and they were flying about 15 feet high.

I have seen migrations of white butterflies many times but never dragonflies.

Could you give me any information about this migration, which may have been caused by the recent floods.

Yours, etc.,  
D.E.BLUNT, Cdr. R.N.(Retd.)  
Mtwapa Creek,  
Mombasa.

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#### EDITOR'S NOTE.

The dragonflies referred to in Cdr. Blunt's letter probably belong to the common species Pantala flavescens which has strong migratory instincts.

This species was seen migrating in vast numbers in many parts of the country towards the end of last year.

This may have been due to the exceptionally heavy rains and to the numerous temporary rain-pools which must have provided the dragonflies with very favourable breeding conditions.

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NEW AFRICAN LEPIDOPTERA

by

R.H. Carcasson  
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VICTORIA MELANOCHLORA sp. nov. (Geometridae, Geometrinae)

Closely allied to V. gordonii Prout, but differs in the absence of black discal spots in all wings, in the much greater size of the black tornal spot of the forewing and in the presence of a large black spot on the dorsum of the abdomen.

MALE

Antenna. Shaft dirty pale yellow with some white scales at the base, pectinations dirty pale yellow.

Head. Vertex shamrock green (R)\*, white anteriorly. Frons blackish brown. Palpi covered in coarse hairs, whitish grey, mixed with blackish brown.

Thorax. Shamrock green (R) above; below covered in coarse greyish white hairs.

Legs. Femora and tibiae grizzled blackish grey, tarsi pale yellowish grey.

Abdomen. Above, shamrock green (R) from base to seventh segment. A large elongated spot consisting of raised black scales from lower half of first segment to centre of fourth segment; black area surrounded by ivory yellow (R) line. Anal tuft pale greyish brown. Below, greyish brown, distal edge of last segment pale greyish brown.

Upperside.

Forewing. Ground colour opalescent hyaline, the effect being produced by the absence of scales above and by the whitish scales of the underside being visible through the transparent wing membrane. Costa green, darker at base and apex. A shamrock green (R) basal area occupying proximal portion of costa, of discoidal cell, of cellule 1b and basal half of 1a, the outer margin of this area running diagonally from a point on the costa placed at 1/5 of its length from the base to a point at the inner margin midway from the base, with a slight indentation towards the base immediately above vein 1b. A green spot with ill-defined margins at apex of discoidal cell, partly inside cell, partly in cellule 4. A large black spot surrounded by a thin creamy white line, with rounded proximal edge and more irregular distal edge, occupies distal third of cellule 1b, distal  $\frac{3}{4}$  of cellule 2 and practically the whole of cellule 3, with the exception of a small hyaline basal area and a green marginal area enclosing a hyaline spot. The large black spot reaches outer margin in cellule 1b and 2, but not in 3. Marginal  $\frac{2}{3}$  of cellules 4, 5 and 6 above black spot green, a hyaline spot in 6 near margin, the whole of cellule 7 green. Cellule 1a entirely green, but interrupted by a hyaline spot at outer margin of green basal area and by another at inner edge of green marginal area. Apex of forewing somewhat falcate, ends of veins slightly produced, particularly vein 4. Cilia green, with a few scattered black scales.

Hindwing. A large square green spot occupies distal third of discoidal cell and base of cellules 3 and 4. Basal half of cellules 1c, 1b and 1a covered in long green hairs. Cellule 1a entirely shamrock green (R), 1b green, except for whitish markings separating green of basal area from green of marginal band. Veins outlined with green scales where they penetrate hyaline areas. A shamrock green (R) outer marginal band with irregular proximal edge from costa to tornus, enclosing a hyaline lunule in cellule 5, and in 4 and one in 3; becoming very narrow in cellule 2, where it is limited to a small terminal area and broadening into a large green tornal area in 1a, 1b and 1c. Margin irregular, strongly concave between veins 3 and 5 and with a short tail at vein 3. Cilia green mixed with whitish and tipped with black from vein 3 to tornus.

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\* Colours marked (R) are taken from Ridgway's "Color standards and Color nomenclature".

Underside.

Forewing. Semitransparent, with a large blackish spot roughly corresponding with green basal area of upperside, but not reaching costa and base of wing. Blackish marginal spot as on upperside, but paler and extending to inner margin near tornus and towards apex to cellule 6, with a few scattered dark scales in 7. Terminal area and cilia cream buff (R).

Hindwing. Semitransparent. The markings which are green above are repeated below in greenish white except near outer margin, where there are large blackish markings in cellules 1b, 1c and 2 and a few black scales in 6. Termen and cilia cream buff (R).

Measurements. Forewing, from base to apex, 21 mm..

Genitalia. Much larger than in V. gordonii; harpe less prominent and strongly toothed, not smooth. A strong spiny process at ventral margin of valve. Aedeagus similar to V. gordonii, but not so strongly chitinised.

Holotype ♂. Bwamba, Toro, W. Uganda, V-1958, R.H. Carcasson; to be deposited in British Museum (Nat.Hist.).

MIMALETIS WATULEKII sp. nov. (Geometridae, Oenochrominae)

Allied to M. reducta Prout, but differs in the more elongated shape of the wings and usually in the presence of a whitish outer margin to the forewing below.

MALE

Antennae. Shaft grey, pectinations black.

Head. Vertex black, surrounded with white; Frons and palpi straw coloured.

Thorax. Tegulae white, edged with black; patagia orange rufous (R), black at base; dorsum orange rufous (R), black with three white dots near base of abdomen. Straw coloured with a few black dots laterally and ventrally.

Legs. Straw coloured.

Abdomen. Dorsally black, each segment with a white triangular wedge with its base resting on the distal edge of the segment. Laterally black, fading to a paler colour; distal edges of segment straw coloured.

Upperside.

Forewing. Ground colour orange rufous (R), somewhat brighter than in M. reducta. Basal  $\frac{2}{3}$  of costa dusted with dirty white; a very small triangular black spot at base of wing, between costa and radius. Apical  $\frac{1}{2}$  of wing from costa to tornus and to apex black; inner margin of apical black area gently rounded, with minor irregularities; black area encloses a large elongated white spot in cellules 4, 5 and 6. Two small white marginal lunules fused together and reaching outer margin in 1b. A white wedge shaped spot, with its base resting on the margin in cellule 2 and a similar, but larger one in 3. Terminal area from vein 4 to apex visibly powdered with white scales. Below vein 4 the white scales gradually predominate in terminal area which becomes almost pure white in cellule 1b. Cilia mainly white, with an increasing admixture of black scales towards apex.

Hindwing. Ground colour orange rufous (R). A round black dot at end of discoidal cell. A broad, regular black marginal band from apex to tornus, enclosing two small white dots in cellules 4 and 5, two larger ones in 2 and 3 and two small white dots fused together in 1b and 1c. Termen and cilia uniformly black.

Underside.

Ground colour paler, more orange than above. Outer marginal area heavily and broadly dusted with white, so that marginal white wedges are no longer visible on forewing. Black apical area remains distinct at apex, costa and end of cell only, so that the large white apical spot merges with the white dusting near the tornus. In



some specimens this white suffusion is more restricted. White marginal spots of hindwing somewhat larger and more regular than above.

Measurements. Forewing, base to apex, 18-20 mm..

Genitalia. Larger and more strongly chitinated than in M. reducta. Valve hairy at apex and ventral margin, covered with slender spines along basal third of dorsal edge. Aedeagus very much stouter than in M. reducta.

#### FEMALE.

Very much like male, but larger. Pectinations of antennae much shorter than in male. White markings on abdomen above larger, but black markings continued to ventral surface. White marginal dusting less extensive above, completely lacking below. Cilia of forewing black. Black discal spot of hindwing variable, but usually smaller than in male; white marginal spots larger.

Measurements. Forewing, base to apex, 20-22 mm.

Holotype ♂. Ikom, Ogoja Province, Nigeria, II-1956, T.H.E. Jackson.

Allotype ♀. Ikom, Ogoja Province, Nigeria, I-1957, T.H.E. Jackson.

Eight ♂ Paratypes and three ♀ Paratypes, same data as above. One Paratype ♂ Mamfe, Br. Cameroons, VI-1956, T.H.E. Jackson.

Holotype and Allotype to be deposited in British Museum (Nat.Hist), Paratypes in Coryndon Museum, Nairobi.

This species is dedicated to Mr. Bonifacio Watuleki, who discovered it.

#### MESOMIMA JACKSONI sp. nov. (Geometridae, Ennominae)

Differs mainly from M. tenuifascia Holland in the white ground colour of both wings.

#### FEMALE.

Antennae. Shaft and pectinations black, but inner surface of first segment dirty white.

Head. Vertex and eyes black, frons white; palpi straw coloured.

Thorax. Tegulae black, forming a black collar; remainder creamy white, somewhat more yellowish below.

Legs. Buffy olive (R).

Abdomen. Creamy white, last segment light buff (R).

#### Upperside

Forewing. Ground colour creamy white. Costal margin broadly black from base to apex. Outer margin broadly black from apex to tornus. A broad black bar joins costal band to outer marginal band and runs from apex of discoidal cell to cellule 2, thus enclosing a large white apical spot in cellules 3, 4, 5, 6, and in the lower portion of 7. In cellule 3 the apical spot is produced into a sharp point with its apex touching vein 3. Cilia black.

Hindwing. Creamy white with a broad black marginal band of even width from apex to tornus. Cilia black.

#### Underside

As above, but basal half of costal margin antimony yellow (R).

Measurements. Forewing, base to apex, 17 mm.

Holotype ♀. Ikom, Ogoja Province, Nigeria, Feb. 1956, T.H.E. Jackson, to be deposited in British Museum (Nat.Hist.).

NEUROPOLODES PEREGRINUS sp. nov. (Geometridae, Ennominae)

Differs from N. anomalus H.S. in its smaller size and more elongated forewing.

## MALE

Antennae. Shaft and pectinations cinnamon (R).

Head. Vertex sayal brown (R), palpi and frons orange rufous (R).

Thorax. Sayal brown (R) above, orange rufous (R) below.

Legs. Orange cinnamon (R).

Abdomen. First segment above sayal brown (R), remainder a little paler; below, orange cinnamon (R).

Upperside

Forewing. Ground colour sayal brown (R). Antemedial band faint and irregular, pinkish cinnamon (R) proximally, snuff brown (R) distally. A very faint snuff brown spot at end of cell. A regular tawny (R) marginal band tapering gradually at apex and at tornus, with narrow snuff brown proximal edge. Faint indications of a dark spot at apex. Cilia tawny, mixed with sayal brown, particularly in cellules 2 and 3.

Hindwing. Uniformly sayal brown (R). Two darker brown straight lines from costa to inner margin, the proximal line narrower and fainter than the distal. Cilia somewhat paler than ground colour.

Underside

Forewing. Orange rufous (R) with faint blackish striae and a blackish spot at end of discoidal cell. Costa somewhat paler than rest of wing. A darker line from apex to tornus, corresponding with similar line on upperside. Inner marginal area and area distal to dark line, vinaceous cinnamon (R).

Hindwing. Orange rufous (R) with faint blackish and reddish irrorations. Distal third vinaceous cinnamon mixed with orange rufous. A dark reddish straight line, corresponding with that of forewing runs from costa to inner margin and separates cinnamon coloured outer marginal area from orange rufous basal area.

Shape. The forewing is more elongated than in N. anomalus; the apex less acute and the outer margin is not evenly concave as in anomalus, but slightly convex from apex to vein 4 and concave from vein 4 to tornus. In the hindwing the costa is very short and the tornus forms a sharp angle.

Measurements. Forewing, base to apex 14 mm.

Genitalia. Valve long, slender with parallel margins and very hairy. Uncus fairly broad and long. Aedeagus short and stout.

Holotype ♂. Bwamba, Toro, Uganda (2,500 ft.), June 1956, R.H. Carcasson, to be deposited in British Museum (Nat.Hist.).

NEUROPOLODES HELLINGSI sp. nov. (Geometridae, Ennominae)

Very closely allied to N. anomalus H.S., from which it differs in its somewhat greater size, in the less acuminate apex, paler ground colour above and more orange ground colour below and in the absence of a well defined median band on the hindwing above.

## MALE

Antennae. Shaft ochraceous buff (R), pectinations darker.

Head. Vertex ochraceous buff (R), frons raw umber (R), sometimes orange chrome (R) ventrally. Palpi orange chrome, last segment darker.

Thorax. Tawny (R) to ochraceous tawny (R) above, somewhat paler towards head. Below orange chrome (R) or darker.

Legs. Orange chrome (R) or darker, tarsi raw umber (R).

Abdomen. Tawny above, somewhat paler than thorax; below zinc orange (R) to orange chrome (R).

Upperside

Forewing. Ground colour variable, tawny to buckthorn brown (R), more or less irrorated with grape green (R); light green irrorations sometimes absent; some specimens speckled with dark brown. A prominent blackish spot always present at costa at base of vein 7, sometimes a diffuse darker area at costa at base of vein 6. Nearly always a small blackish dot at end of discoidal cell. Usually a straight, faint dark line from below costal spot at vein 7 to inner margin at a point  $\frac{1}{3}$  of length of inner margin from tornus. Costa strongly convex at origin of vein 6, apex acute, outer margin uniformly, but slightly concave. Cilia uniform, but variable in colour.

Hindwing. Ground colour as in forewing, but paler near base and costa. In some specimens the outer marginal area of wing is paler than the discal area. A small hyaline dot, usually surrounded with black, at end of cell, sometimes forming part of a broken, irregular dark median fascia from middle of costa to middle of inner margin. Outer margin evenly curved, cilia darker than ground colour.

Underside

Forewing. Orange (R) at costa, remainder of wing light yellowish olive (R) to brownish olive (R), more or less washed with orange and speckled with brown. A chestnut brown (R) spot at costa near apex. Sometimes a blackish dot at end of discoidal cell, larger than the one above. A more or less defined straight blackish line from vein 7 to inner margin. Ground colour much paler and less speckled near inner margin.

Hindwing. Ground colour orange (R), more or less speckled with rusty red to olive brown, particularly at costa and outer margin. A thick, straight, blackish median band from costa to inner margin, variable in width and blurred at the edges. A small hyaline dot at end of discoidal cell surrounded by dark colour of median band. Cilia brown.

Measurements. Forewing, base to apex, 19-20 mm.

Genitalia. Uncus short and fairly blunt. Valve entire, slender and hairy. Aedeagus short, stout and not heavily chitinated.

Holotype ♂. Katera, Sango Bay, Masaka, Uganda, X-1960, R.H. Carcasson, to be deposited in British Museum (Nat.Hist.).

Paratype ♂♂. Six, same data as Holotype.

One, Fort Portal, Toro, Uganda IX-1961, N.P. Mitton.

One, Kalinzu Forest, Ankole, Uganda, XI-1961, R.H. Carcasson.

Two, Bena Dibebe, Sankuru, Kasai, Congo, IV-1959, R.H. Carcasson.

Two, Loile R., Ikela, Equateur, Congo, IV-1959, R.H. Carcasson.

Paratypes in Coryndon Museum.

Congo specimens tend to be larger, with less acute forewing, less speckled above and more uniformly orange below.

This species is dedicated to my friend and colleague, Mr. G.M. Hellings.

MESOTHISA CRASSILINEA sp. nov. (Geometridae, Ennominae)

Closely allied to M. gracilinea Warren, but darker, more heavily marked and with blunter marginal indentations.

MALE

Antennae. Cinnamon buff (R).

Head. Frons and vertex cinnamon buff (R), palpi generally darker, last segment sepia.

Thorax. Cinnamon buff (R) above, somewhat darker, speckled with sepia, below.

Legs. Cinnamon buff (R) speckled with sepia.

Abdomen. Cinnamon buff above, darker below and speckled with sepia; anal tuft darker; two small blackish dots on each segment above.



Upperside

Forewing. Ground colour clay coloured (R), with darker greyish irrorations and speckled with blackish. A faint, darker antemedial fascia, oblique from costa to centre of discoidal cell where it forms an obtuse angle and continuing straight down to inner margin. A small dark dot at base of vein 5. A very faint medial fascia, parallel to antemedial, but not extending beyond cubitus. A narrow, straight, well defined subterminal line, dark brown proximally, edged distally by a single row of pale cinnamon scales, from costa to inner margin where it bends sharply towards base. A faint darker mottling outside subterminal line, in cellules 3,4 and 5. Cilia dark brown from apex to 1a, tawny olive (R) from 1a to base. Apex sharply acuminate and margin strongly concave between apex and end of vein 4.

Hindwing. Ground colour as in forewing. Area between vein 6 and costa much paler, free from dark irrorations and blackish speckling. A blackish dot at end of discoidal cell. A straight dark line from just below costa to inner margin, continued from subterminal line of forewing, but darker, thicker and placed more proximally. Three faint dark dots on veins 2,3 and 4, between subterminal line and margin. Cilia dark brown. Margin straight from apex to vein 4, where there is a short blunt tail. Strong internervular marginal concavities from vein 4 to tornus. The whole wing has a marked rhomboid shape.

Underside

Ground colour somewhat paler than above, but dark irrorations heavier. Antemedial fascia of forewing absent, medial fascia better defined and displaced towards base. Subterminal line paler and similarly displaced. Dark mottling in cellules 3,4 and 5 darker and more extensive, extending to margin. Inner marginal area of forewing paler and free of dark irrorations. Hindwing like forewing, irrorations extending to costa, line from costa to inner margin narrower and paler than above and evenly curved.

Measurements. Forewing, base to apex, 21-22 mm..

Genitalia. Valve narrower than in M. gracilinea. Ventral process of valve longer and narrower, densely spinose at apex. A crescent shaped plate, covered in spines, at base of tegumen. Uncus shorter and more pointed than in M. gracilinea. Aedeagus slender, with a large, strongly chitinated internal structure pointed towards apex.

Holotype ♂. Kayonza, Kigezi, Uganda V-VI 1957, T.H.E. Jackson, to be deposited in British Museum, (Nat.Hist.).

Paratype ♂ ♂. Two same data as above.

Two Bena Dibebe, Sankuru, Kasai, Congo, IV-1959, R.H. Carcasson.

One Kalinzu Forest, Ankole, Uganda, XI-1961, R.H. Carcasson.

Paratypes in Coryndon Museum, Nairobi.

GEOLYCES VARIEGATA sp. nov. (Geometridae, Ennominae)

Allied to G. convexaria Mabille, but differs in being boldly marked with brown and in having a crenulated margin.

MALE

Antennae. Inner surface of shaft Dresden brown (R), outer surface warm buff (R); pectinations black.

Head. Frons buckthorn brown (R), vertex and palpi Dresden brown (R).

Thorax. Warm buff (R) speckled with darker scales above, not speckled below.

Legs. Warm buff (R) speckled and ringed with dark brown.

Abdomen. Warm buff (R) above and below; traces of two dark dots on each segment above.

Upperside.

Forewing. Ground colour warm buff (R) speckled and irrorated with yellow ochre (R). Antemedial fascia Sudan brown (R), rather broken and irregular. A small brown dot at the cubitus and another on vein 1a. A somewhat diffuse dark fascia from base of vein 2 to inner margin. A further and more diffuse fascia from vein 3, converging

with first fascia at inner margin. End of discoidal cell marked by a narrow, dark brown line. A heavy Sudan brown (R) streak along vein 6. A prominent black spot at costa, near base of vein 8 and a small black dot on each vein immediately inside postmedial band. The postmedial band consists of a narrow dark brown line running from the apex diagonally towards base of wing until it intersects veins 3 and 4 near their origin, beyond which point it runs parallel to the outer margin until it reaches the inner margin. The area distal to the postmedial band is mainly buff-yellow (R), heavily irrorated with Sudan brown (R). A solid, square Sudan brown patch in cellules 2 and 3 immediately outside postmedial band and two elongated whitish ocelli surrounded with blackish in cellules 6 and 7. A faint brown submarginal band from outer edge of square brown patch at vein 2 to inner margin. Apex acute, outer margin prominently and bluntly convex at end of veins 5 and 6. Cilia Sudan brown (R), except at vein 5 and at tornus, where they are buff-yellow (R).

#### Hindwing.

Ground colour warm buff (R) speckled and irrorated with yellow ochre (R); costal area comparatively free from irrorations. A diffuse dark subbasal fascia from centre of discoidal cell to inner margin, becoming darker and better defined near inner margin. A narrow, deeply crenulate dark antemedial band from costa to inner margin. End of discoidal cell marked by a narrow dark brown line, as in forewing. A short blackish line from vein 2 to inner margin, immediately proximal to postmedial band. Postmedial band as in forewing, but very faint near costa and uniformly parallel to outer margin. Marginal area heavily suffused with Sudan brown (R). An irregular and somewhat diffuse brown subterminal band, particularly well developed in cellules 2 and 3. Regular internervular marginal concavities, vein 4 being more strongly produced, thus giving the outer margin a somewhat quadrate appearance. Cilia uniformly Sudan brown (R).

#### Underside

Like upperside, but less heavily irrorated and speckled. Dark markings better defined than above.

Measurements. Forewing, base to apex, 20-22 mm..

Genitalia. Uncus bifid and hairy, longer than in G. convexaria. A process projecting inwards from ventral margin of each valve with a heavily chitinated hook at apex, much broader than in G. convexaria. Valve entire, not bifid as in G. convexaria. Aedeagus slender, without two strong protruding apical spines as in the above species.

Holotype ♂. Fort Portal, Toro, Uganda IX-1961, N.P. Mitton, to be deposited in British Museum, (Nat.Hist.).

Paratype ♂ ♂. Seven, Kalinzu Forest, Ankole, Uganda XI-1961, R.H. Carcasson.  
One, same data as Holotype.  
Two, Kayonza, Kigezi, Uganda V-VI-1957, T.H.E. Jackson.  
One, Bwamba, Toro, Uganda IX-1961, N.P. Mitton.

Paratypes in Coryndon Museum.

#### XENIMPIA MISOGYNA sp. nov. (Geometridae, Ennominae)

Allied to X. chalapa Prout. Differs in being darker, less variegated and in having a more acute apex to the forewing.

#### MALE

Antennae and head olive buff (R), palpi darker. Thorax, abdomen and legs olive buff (R), more or less densely speckled with brown.

#### Upperside

Forewing. Ground colour olive buff (R), densely speckled with dark brown. Costa heavily striated with blackish brown. A conspicuous blackish brown streak at end of discoidal cell. Traces of a very diffuse dark antemedial fascia. A slightly diffuse, evenly curved dark postmedial fascia from costa to inner margin. A narrow, straight

subterminal line consisting of closely spaced blackish brown dots, from costa to inner margin. A small, dark dot in cellule 7, near apex. Ground colour between subterminal line and outer margin a little darker than elsewhere. Cilia dark brown at apex and at vein 3, olive buff (R) speckled with brown elsewhere. Apex and tornus acute, outer margin fairly straight.

Hindwing. Ground colour as in forewing. Antemedial fascia absent. Postmedial fascia much more diffuse than in forewing. Subterminal fascia as in forewing. Ground colour darker in outer marginal area, as in forewing. A very small dark dot at end of discoidal cell. A fringe of long whitish hairs at inner margin, from base to tornus. Cilia uniformly olive buff (R). Outer margin produced into a short tail at vein 6.

#### Underside

Almost identical to upperside. Forewing inclined to be a little darker, hindwing a little paler.

Measurements. Forewing, base to apex, 14-15 mm..

Genitalia. Uncus heavily chitinated, short, pointed and hairless. Valve short, very broad at base, with a densely spinose flange projecting at ventral margin. Aedeagus slender, apical third furnished with a projecting blade-like structure made up of small, contiguous pointed plates.

NOTE. Specimens from Bwamba, Toro, Uganda are smaller and not as well marked as above. Specimens from Kalinzu, Ankole, Uganda are larger and darker. These two forms may well represent good geographical races, but it would be unwise to describe them without more adequate material, particularly females.

Holotype ♂. Ngong, Nairobi, Kenya V-1956, R. Coulson, to be deposited in British Museum (Nat.Hist.)

Paratype ♂ ♂. Ten, all from the type locality (Fowler & Coulson leg.).

Paratypes in Coryndon Museum, Nairobi.

MYLOTHRIS LEONORA Kruger (Pieridae, Pierinae)

Mylothris leonora Kruger Int. ent. Zeit. 22, 2, p. 21, 1928.

Pseudomylothris Neustetter Int. ent. Zeit. 23, 18, p. 191, 1929.

Neustetter based his genus Pseudomylothris (genotype: leonora Kruger 1928) on two ♀ ♀ from Ukami, Uluguru Mts., Tanganyika which are housed in the British Museum (N.H.), and the main character of Pseudomylothris is said to be the absence of vein 10 of the forewing.

Late in 1959 Dr. A.H.B. Rydon collected a small series (three ♂ ♂, one ♀) of this species near the type locality. These specimens were compared to the two ♀ ♀ in the British Museum (Holotype and one Paratype) by Mr. T.G. Howarth and there is no doubt that they are leonora Kruger.

On closer inspection all Dr. Rydon's specimens turned out to have the typical Mylothris venation, with vein 10 present in the forewing.

Mr. Howarth examined the two British Museum specimens again and discovered that the Holotype has the typical Mylothris venation, whereas the Paratype has vein 10 missing, or more probably 9 (=R3), (see Talbot, Trans.R. ent. Soc. Lond. 94 : 155-185), and that Neustetter must have based his Pseudomylothris on the venation of the aberrant Paratype, and not on that of the normal Holotype. The other characters cited by Neustetter (shape of the discoidal cell) are too trivial to warrant generic status; the facies, male genitalia and venation of leonora agree very well with Mylothris and therefore Neustetter's genus Pseudomylothris must sink into synonymy and leonora must be referred to Mylothris Hübner (1819). The male of this species is still undescribed and I take this opportunity to describe it.



MALE

Similar to M. sagala crawshayi Butler, but larger and more robust; lacks black streak or dot at end of vein 7 of hindwing, which is present in the males of sagala forms.

Antennae, body and legs as in female.

Upperside

Forewing. Ground colour white. Base blackish, costa broadly blackish. A large blackish apical spot ending at outer margin in cellule 3, projecting sharply inward along vein 4. Three blackish triangles with base resting on outer margin and apex on vein, at ends of veins 3, 2 and 1a, progressively smaller from 3.

Hindwing. Uniformly chalcedony yellow (R). A blackish suffusion at base of wing, particularly developed in the discoidal cell and in cellule 1c. Black terminal dots at veins 1b, 2 and 3 minute or absent.

Underside

Forewing. White, with black areas of upperside showing through very faintly. A slight suggestion of very pale greenish yellow at costa and apex.

Hindwing. Uniformly pale chalcedony yellow (R). A narrow wax yellow (R) streak along costa, from base to apex. Black terminal dots as above.

Measurements. Forewing, from base to apex, 27-28 mm.

Genitalia. Very similar to M. sagala Sharpe, but uncus more pointed, valve not so rounded, harpe more irregular in outline.

Neallotype ♂. Uluguru Mts., Tanganyika, XI-1959, A.H.B. Rydon, to be deposited in British Museum, (Nat.Hist.).

PAPILIO ECHERIOIDES Trimen, NYIRO ssp. nov. (Papilionidae)

MALE

Differs from nominate S.African echerioides in the more quadrate shape of the hindwing and in the greater development of the white marginal spots of the hindwing, which merge with the internervular white cilia and are not separated from them by a black terminal line.

The underside does not differ appreciably from the nominate race.

FEMALE

Forewing. All light spots washed with very pale ochre, not white, as in the nominate race. Pale spot in cellule 2 smaller than in nominate race, all submarginal spots much larger.

Hindwing. Shape more quadrate than in nominate race. Dark basal area larger, but not so well defined, very pale ochreous, rectangular, not rounded as in echerioides. Marginal spots very pale ochreous, not white as in nominate race, broader and nearer the margin.

The female appears to be a mimic of Amauris echeria septentrionis Poulton, where-as the nominate ♀ imitates A. albimaculata albimaculata Butler and the ♀ of P. echerioides leucospilos Rothschild from S. Ethiopia imitates the much darker A. echeria steckeri Kheil.

P. echerioides nyiro is a large race and measures 42-45 mm. in the ♂ and 49 mm. in the ♀, from base to apex of the forewing.

Holotype ♂: Mt. Nyiro, 7,000 ft., Northern Frontier District, Kenya II-1946, T.H.E. Jackson.

Allotype ♀ : Same data as above.

Holotype and Allotype to be deposited in British Museum (Nat.Hist.). Several males in collections T.H.E. Jackson and V.G.L. van Someren.

This race has so far only been found in a very isolated montane forest on Mt.Nyiro, S-E of Lake Rudolph.

There appear to be at least two other undescribed races of P. echerioides in East Africa , but it would be unwise to describe them without more comparative material.

#### EXPLANATION OF PLATES

- PLATE I
1. *Victoria melanochlora* sp. nov., Holotype ♂.
  2. *Mimaletis watulekii* sp. nov. Holotype ♂.
  3. *Mimaletis watulekii* sp. nov. Allotype ♀
  4. *Mesomima jacksoni* sp. nov. Holotype ♀.
  5. *Neuropolodes hellingsi* sp. nov. Holotype ♂.
  6. *Neuropolodes peregrinus* sp. nov. Holotype ♂.
  7. *Geolyces variegata* sp. nov. Holotype ♂.
  8. *Mesothisa crassilinea* sp. nov. Holotype ♂.
  9. *Xenimpia misogyna* sp. nov. Holotype ♂.
  10. *Papilio echerioides nyiro* ssp. nov. Holotype ♂.
  11. *Papilio echerioides nyiro* ssp. nov. Allotype ♀.
  12. *Mylothris leonora* Kruger, Neallotype ♂.

(Photos by C.F. Hemming and G.L. Lucas)

- PLATE II
- Genitalia.
13. *Xenimpia misogyna* ♂ x 20.
  14. *Mesothisa crassilinea* ♂ x 20.
  15. *Geolyces variegata* ♂ x 20.
  16. *Neuropolodes peregrinus* ♂ x 20.
  17. *Mylothris leonora* Kruger ♂ x 20.

- PLATE III
- Genitalia.
18. *Victoria melanochlora* ♂ x 13.
  19. *Mesomima jacksoni* ♀ x 13.
  20. *Neuropolodes hellingsi* ♂ x 13.
  21. *Mimaletis watulekii* ♂ x 13.
  22. *Mimaletis watulekii* ♀ x 13.







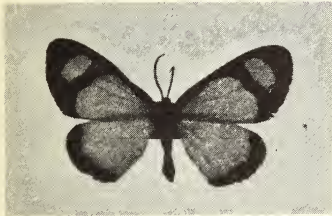
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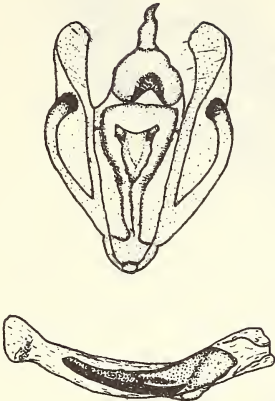


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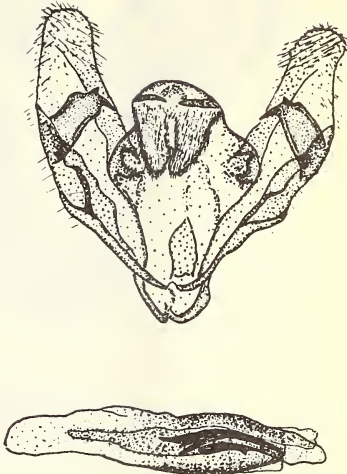




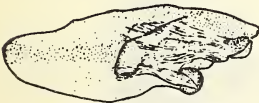
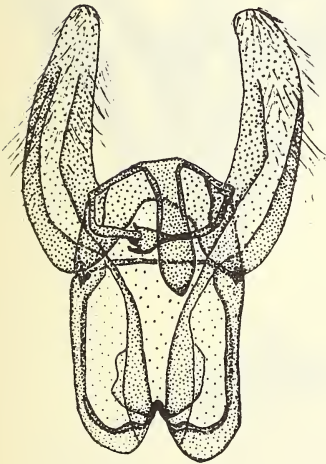
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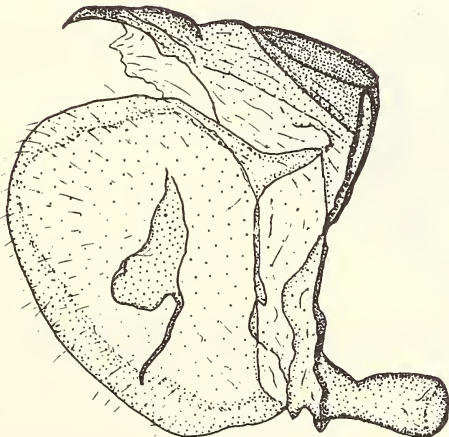
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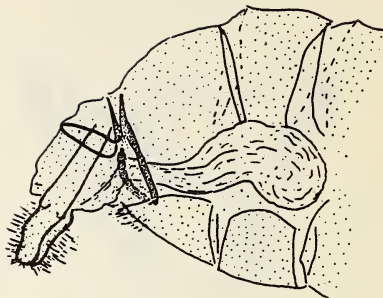
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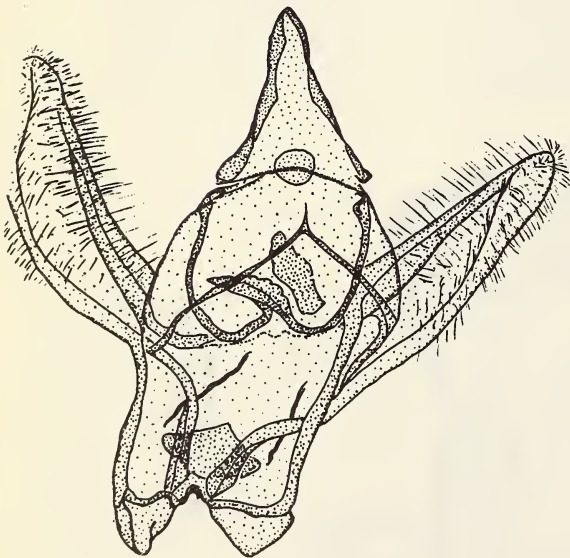




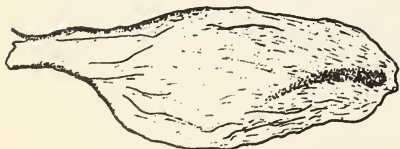
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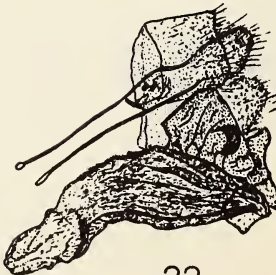
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# Nature notes

## ABDIM'S STORKS BREEDING ON CLIFFS

On my way from Lokitaung, in the Turkana District of Northern Kenya, to Kibish in the Ilelmi triangle, Southern Sudan, I saw a small colony of Abdim's Storks, Sphenorynchus abdimii (Lichtenstein) using cliff ledges as a breeding site. These cliffs form part of the Katheriangor range of hills and faced east. About 6 miles away is the Nalingi Kenya Police Post and the Kenya border. At the time, June 8th/9th 1961 the breeding season appeared to have begun, the large piles of sticks forming the nests were in various stages of development and were quite new. The site must have been used on at least one previous occasion as the new nests were built on top of the old. The old nests underneath were conspicuous and white with droppings. 25 birds were counted in the two colonies which, although about 100 yards apart, were on the same level on the cliff. One bird appeared to be incubating as it was sitting close on the nest on the two occasions I passed. The other 24 birds were standing around on the cliff ledges, near, or on, the nests and showed no sign of activity, this is quite understandable as it was 2 pm. and very hot. The cliffs were 300 to 400 ft. in height, the nesting site about 100 ft. from ground level. One colony was definitely larger than the other, the smaller colony consisting of only three nests.

I estimated that there were 35-45 birds in a radius of 10 miles. The birds were usually seen in parties of 3-5 and feeding on the ground. I did not see any of these storks further afield.

I cannot account for this unusual choice of nesting site as there were a fair number of fairly large trees nearby, but the local native buildings are of a flimsy and temporary structure.

The identity of these birds is unmistakable as the greenish bill is a conspicuous feature when birds are seen feeding on the ground close up.

E.J. Blencowe. M.B.O.U.  
October 1961

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## GREY PLOVER ON LAKE NAKURU

A single Grey Plover, Charadrius squatarola squatarola (Linnaeus) was seen on the shore of Lake Nakuru on January 11th 1958. The bird appeared to have some injury of the leg as it was unable to walk properly, but it could fly quite strongly. The identity was unmistakable as the black axillary patches were so conspicuous.

According to Praed and Grant, 'African Handbook of Birds', the range of the Grey Plover in Eastern Africa is throughout on the coast and Great Lakes in non-breeding season.

E.J. Blencowe M.B.O.U.      October 1961.

## PINK FOOTED PUFF-BACK BREEDING IN KAKAMEGA FOREST

On May 1st. 1961 I found a nest made by the Pink-footed Puff-Back, Dryoscopus angolensis nandensis Sharpe. The nest was in a dead tree near a broad forest path. Although the tree was not large I was unable to climb it to make the detailed notes of the nest as required. The tree was covered with thick creeper and the nest which was about three feet from the main trunk of the tree, was built on a strong horizontal branch, and was well hidden in the thick foliage, it was about 20 feet from the ground. The choice of site I thought typical of some of the other shrikes and I have noticed that Mackinnon's Shrike would choose this sort of site for a nest. There were young birds in the nest and I presumed that they must have been fairly well grown as they were extremely vocal whenever the adult bird approached the nest. The nest appeared to be fairly large, cup shaped and covered on the outside with lichen. All feeding was done by the hen, the cock bird taking no part although he remained near the nest site or followed the hen on her foraging expeditions. I was only able to visit the nest on the one occasion.

According to Praed and Grant, 'African Handbook of Birds', there are no breeding records.

E.J. Blencowe, M.B.O.U. Oct. 1961

Dear Sir,

With reference to Priscilla Allen's letter (ibid 23, 232 (1960)) I can throw a little light on the nature of her larvae. The Professor of Zoology is certainly correct; they are indeed fly larvae. I observed several of the glutinous colonies, described by Miss Allen, some years ago on the asphalt path outside the Herbarium in Nairobi. I made detailed notes which unfortunately I am unable to find now. The colonies were extensive and I believe they had emerged from a termite hole in the earth bordering the path. The leading edge of a colony, I clearly remember, was very mobile and kept splitting into streams which often later reunited. The whole colony tended to be pear-shaped. I collected a few of the larvae and Dr. Paul Freeman of the British Museum (Nat.Hist.) identified them as Sciara sp. (Diptera: Sciariidae). The formation of glutinous colonies by the larvae of a species of this genus (S. militaris) has been reported from Europe. Anyone fortunate enough to see colonies of this nature should describe them in some detail since little is known about them.

Yours etc.

B. Verdcourt,  
East African Herbarium,  
Nairobi, Kenya. 16/8/1961



### UNUSUAL BIRDS AT THE COAST

During a fortnight at the coast at the end of 1961, I saw three birds which I had not previously seen in visits spread over about thirteen years. All three were on the coast immediately south of Mombasa.

REDSHANK, Tringa totanus (Linnaeus).

Although Mackworth Praed and Grant state that the eastern race, eurhinus (Oberh.), is a common visitor to the Red Sea and the East African coast I have never before seen a Redshank near Mombasa. Associating for a while with Greenshanks at high tide, this bird was appreciably smaller, and the red legs, long bill, white rump and secondaries appear to leave no doubt as to its identity.

EASTERN GOLDEN PLOVER, Charadrius fulvus Gmelin.

This was seen at the same location and again is my first record in Kenya. The bird was conspicuous among the numerous Grey Plovers with which it associated, being distinctly smaller, more brown and yellow, and lacking any white on the wings and tail. The axillaries were inconspicuous and definitely not black and the bill was noticeably small compared with the Grey Plover. When disturbed it tended to perch high up on the beach, by itself.

Possible WHITE-TAILED PLOVER, Vanellochettusia leucura (Lichtenstein).

On 27th December I saw a solitary plover, which was a complete stranger to me, on the sea shore below the coral cliffs south of Mombasa. Standing on the shore the only features remarked were the long thin legs, short plover-like bill, plain brown head and upperparts, grey throat and breast and white belly and undertail coverts. I thought the eye, or round it appeared whitish. When the bird took alarm and flew off, it climbed high and all I noticed was the white tail and quite a lot of white in the wing. It seems possible that this was a White-tailed Plover, Vanellochettusia leucura, but if so, it was well south of its recorded range and unusual on the sea shore. I believe there has been another possible Kenya record at Lake Rudolf.

H.J.Lee.23/3/62

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### EARLY ARRIVAL OF CASPIAN PLOVER

On 6th August 1961, I saw a party of seven Caspian Plover, Charadrius asiaticus Pallas, resting on dry mud near the hot springs at the southern end of Lake Magadi. Two appeared to be adults in winter plumage and five juveniles. The birds seemed tired and reluctant to move, but when eventually flushed for a short distance the white spots on the inner primaries were noticeable. This appears to be an unusually early arrival of this species. Messrs. Mackworth-Praed and Grant say that the Caspian Plover arrives in October, but Fuggles-Couchman has recorded their presence at Dar es Salaam on 11th September. (Ibis 1958 page 450).

H.J.Lee.23/3/62

## Book Reviews

### "KENYA TREES AND SHRUBS"

By

I.R. Dale and P.J. Greenway.

XXVII + 654 pages of text and line drawings, 112 plates and folded map: 9½ x 6½ inches, Buchanan's Kenya Estates Ltd. and Hatchards, 1961 (84/-)

This volume has been needed for over fifty years, since despite the appearance of two prior much smaller works devoted to the subject, nothing of a comprehensive nature has previously been published. The former accounts were not very helpful, unless one already had a fair idea of what the plant was or had available an accurate native name, since they consisted of sparse descriptions and had few or no illustrations and no keys; moreover, they were inaccurate, having been written at a stage when a large percentage of specimens were wrongly determined even by the accepted authorities. Since those days a great deal of revisional work has been carried out mainly by botanists of European nations having interests in Africa. The authors of the present book were in the unenviable position of writing it at a time when all African botany seems to be in the melting pot and names change and change again overnight. It is a truism that anything written is to a certain degree out of date as soon as it is published, but this is particularly true of botanical compilations produced at the present time. Some parts are absolutely up to date and based on final revisions (e.g. *Acacia*), other parts are based on work done long ago (e.g. *Commiphora*); future revisions are bound to change such parts. Occasional lists of corrigenda and addenda are all that will be needed to keep the volume up to date and in accordance with accepted modern views.

The great Flora of Tropical East Africa, which is proceeding very slowly owing to the onerous work involved in revising past errors, work which often involves complete revision and delving into the botany of areas far removed from East Africa, will not be finished for a very long time. It is therefore essential to produce less complicated books locally which, although of a reasonable standard of accuracy, appear more rapidly.

What does the four guineas purchase? There are descriptions of most of the sizeable woody plants to be found in Kenya and illustrations of a surprising number of them. There are keys to the families, genera and species, so that even a complete stranger is able to find his names, so long as he has some basic botanical knowledge. I have not tried the key to the families to see if it works but it is based on several others which undoubtedly do. After a time, all botanically-minded folk obtain a knowledge of family characters and will more or less know where to look without wading through the keys. There are also lists of native names and these have long been the accepted method of trying to find out what a tree is, even by foresters; it is a very dangerous method which leads to a great number of errors unless one has managed to obtain the services of an African with a good knowledge of his local plants. It is much better to collect and try to name the material oneself, else there is no confirmation of the name one obtains.

The book is a skilful mixture of a popular work and a flora of sufficient exactitude to make it valuable to professional botanists. The citation of specimens for example is an excellent procedure (I must admit to being very thrilled to see almost a hundred of my own gatherings mentioned) thus making it easy for any botanist to make sure what plant is really meant even if the name used in the book eventually proves to be wrong. The text is, to be quite honest, anything but popular, but the botanical terminology can easily be understood by reference to the very ample glossary. Those who wish to learn, will not be deterred by complex language which is so economical of space, one scientific word often being the equivalent of a long phrase, and more accurate. The book is self-contained and needs no adjuncts to render it usable.

## Book Reviews

The printers are not to be congratulated on the coloured plates - the poor quality of their reproduction is the chief blemish in the volume. The artist may justly be annoyed to see her work reproduced in such a way. Many of the plates are from the same blocks as used in "The Indigenous Trees of Uganda", but their reproduction in the latter book is greatly superior. It is a sign of the times when poor work is becoming as characteristic of Great Britain as meticulous work once used to be in the previous century, that even after a glance at the first pulls the printers did not try and improve matters. Even the black and white photographs would have been greatly superior if printed on a proper art paper. The binding on the other hand is excellent. The original line drawings by Dr. Eggeling are poor but a poor drawing is better than nothing. The numerous drawings by Mrs. Church, a skilled systematic botanist herself, are exceedingly good and give the book a lasting scientific value. Whatever they are said to portray, they are accurate drawings which can be referred to by other workers as standard illustrations. The exact identity of the plates drawn will never be in doubt since Mrs. Church has meticulously indicated which specimens she has drawn from. They are up to the high standard required by professional botanists and to my mind are the most important part of the book.

Nothing has ever been written which contained no errors. Owing to the careful checking by Dr. Greenway with original spellings, and careful proof correcting, misprints are exceedingly few and mistakes are rare. Instead of just carping on a few errors I have listed those which have struck me at a first reading in the form of a preliminary list of corrigenda and addenda which I trust will be useful.

Finally I must voice on behalf of the public at large and botanists in particular, thanks to Messrs. Buchanan's Kenya Estates Ltd. who are to be congratulated on their public spiritedness in helping to make this volume a reality. I do not think they will lose any money over the venture in the long run, since the book is assured of a steady sale throughout the world until it is sold out.

### Corrigenda and Addenda to Dale and Greenway "Kenya Trees and Shrubs"

Page	Remarks
XIII (and all later references to this plant)	<u>Euclea divinorum</u> Hiern subsp. <u>keniensis</u> (R.E. Fries) De Wit. The author should I believe be De Winter but do not think the change has been published.
XIV (and all later references to this plant)	The name <u>Pistacia aethiopica</u> Lincz. may not be published; it is best at present to continue calling it <u>Pistacia lentiscus</u> L. var. <u>emarginata</u> Engl.
13	An undescribed species of <u>Pandanus</u> (first collected by Mr. Dale) occurs in the Embu area. Good material has recently been obtained and it will be described.
18	<u>Mimulopsis glandulosa</u> (Lindau) Bullock does not seem to be distinct from <u>Mimulopsis solmsii</u> Schweinf.
23	See note about page 222.
32	<u>Annona chrysophylla</u> Boj. is not distinct from <u>Annona senegalensis</u> Pers.
40	I am not at all certain that my 2124 is correctly named <u>Uvaria welwitschii</u> (Hiern) Engl. & Diels; that is a rambling shrubby plant, mine was definitely a proper tree, the geographical distribution would also be unusual. The determination was made by Kew.



- 48 Plaggya does not appear to be distinct from Wrightia hence the name is Wrightia demartiniana Chiov.
- 58 Recently Ahrendt has described a Berberis grantii from East Africa but it is entirely synonymous with Berberis holstii Engl.
- 112 The family Cappariaceae has been returned to us after revision at Kew. Most of this work has yet to be published but a great many names in this book will have to be altered.
- 138 The genus Dichapetalum has been omitted - the following species occur in Kenya: deflexum Klotzsch, keniense Hutch. & Bruce and ruhlandii Engl. and sp.nov., apart from some truly climbing species.
- 145 The species labelled Combretum molle R. Br. ex G. Don and Combretum queinzii Sond. in our herbarium are very distinctly different but they are part of a difficult complex when Africa as a whole is considered.
- 177 Euclea divinorum Hiern is quite distinct from Euclea schimperi (DC.) Dandy in leaf shape and the scaliness beneath the leaves. Typical subsp. divinorum also seems to occur in Kenya.
- 181 The spelling is Erythroxylum platycladum according to the references available to me.
- 206 Jatropha dichlar Macbride is the correct name for Jatropha ferox.
- 222 The position of the genus is doubtful - it still looks to me to be Anacardiaceae and near to Lannea.
- 229 Scolopia rhamniphylla Gilg.
- 230 According to Prof. St. John only one species of Scaevola occurs on our coasts and Scaevola plumieri is a synonym of Scaevola taccarda (Gaertn.) Roxb.
- 234 If the American plant is the same as the Asiatic and African one then the correct name is Gyrocarpus americanus Jacq.
- 235 The correct name for Hypericum lanceolatum Lam. is Hypericum revolutum Forsk. The fact that the Arabian species is the same plant called by another name elsewhere was overlooked when the F.T.E.A. account was written.
- 237 Hypericum roeperianum.
- 238 We have had the type of Jobalboa aberdarica Chiov. on loan from Turin and the genus is, as was suspected, quite fictitious - it is identical with Apodytes dimidiata E. Mey. ex Bernh.
- 241 Leonotis leonitis R.Br. in Ait. is correct spelling but identification needs confirmation.
- 242 A species of Beilschmiedia has recently been found in Kakamega Forest by Mr. Lucas.
- 242 Prof. Robyns has described a further species Ocotea argylei from Kenya.
- 243 Couroupita.
- 248 Anthocleista zambesiaca Baker has proved to be a synonym of the Comoro Island species Anthocleista grandiflora Gilg. which is the older name.

## Book Reviews

- 249 The genus Mostuea has recently been completely revised but a copy of the work has not yet been received.
- 256 This appears to have been painted upside down.  
Coloured plate 15
- 260 C. cinereus Nied.
- 265 The genus Warneckea has been sunk so the name is now Memecylon amanienae (Gilg) A. & R. Fernandes.
- 315 Ficus mallotocarpa Warb.
- 365 Erythrina rotundato-obovata Bak.f. is the correct spelling. This actually is not the correct name anyway - it should be called Erythrina melanacantha Taub. ex Harms
- 445 Heinsenia occurs on Marsabit.
- 465-6 Psychotria nairobiensis.
- 496 Recent work for the F.T.E.A. has shown that Dobera glabra (Forsk.) R.Br. and Dobera loranthifolia (Warb.) Warb. ex Harms are quite distinct. Of the cited specimens Dale 302, 780 and Gillett 13651 are glabra; Graham 1685 and Donald 2466 are loranthifolia; the Battiscombe sheet I have not seen. The figure fortunately shows what it purports to show. In the text the ovary is said to be 1-celled but the plate clearly depicts a 2-celled ovary.
- 521 Several unpublished new combinations have found their way into print. It is hoped that the long delayed account of the Sapotaceae for the F.T.E.A. will soon be published.
- 537 The Discopodium sp. is Discopodium eremanthum Chiov.
- 552 The species said to be near Sterculia stenocarpa Winkler is that species.
- 556 Peddiea arthuri T.C.E. Fries described from Mt. Kenya is a synonym of Peddiea volkensii Gilg but the name has been omitted.
- 569 Grewia nematopus K.Schum. is I think a distinct species.
- 576 It should have been mentioned that Celtis mildbraedii Engl. had previously been wrongly called Celtis soyauxii Engl.
- 591 Add Marsabit to distribution data. Fig. 107 was actually drawn from a Marsabit specimen and the specimen is cited.

B.V.

## Further Corrigenda

The coloured frontispiece is incorrectly attributed to the Kenya Information Department. It was in fact taken by the Associated British Pathe Film Co.

Photos 20, 71, and 72 should be attributed to Kenya Forest Department and not to Kenya Information Department.

Photo 78. The tree shown in the main picture is not Premna maxima, although the inset of flowers and bark is correct.

Div. Forest Officer, Nyeri.

"THE GENUS MONADENIUM"

By

Peter R.O. Bally.

12 x 8¼ inches, 111 pages, 32 separate plates, mostly coloured, 16 pages of photographs and numerous text figures and maps, Benteli, Berne. 1961. About £3.

Sometimes a person accomplishes a task by which he will always be judged, no matter what other work he has carried out, a task which in itself justifies his scientific life. Mr. Bally's completion of a revision of the genus Monadenium is just such a task; it represents the culmination of a series of patient researches which have occupied a quarter of a century. A great many workers naturally produce works describing researches just as accurate and patient but Mr. Bally's book is also something much rarer - it is an artistic masterpiece. It would be a pleasure to own even if one were not remotely interested in what it was about. This is due not only to his own consummate skill, and I do not hesitate to judge his flower paintings as good as any produced, at any time, anywhere, and more accurate than most, but to the careful work of the publishers, printers and block makers, Benteli AG and Denz AG of Berne. The highest standards of printing have been attained and the paper used is of excellent quality. Nothing has been spared to make this a 'flower book' in the best sense of that word, comparable with and fit to share a bookshelf with the splendid illustrated botanical works of the last century. Obviously it is not possible for the researches of all botanical workers to be published in so sumptuous a manner; the money is not available, even if the talent could be found, to illustrate those of the less fortunate of us who have no artistic achievements. It says much of Mr. Bally's tenacity, and even more of the intrinsic merit of the work itself, that he has managed to find a publisher and financial supporters to elaborate so fully and beautifully what is actually a small genus of plants of no practical interest, although from a purely botanical standpoint, they are intensely intriguing.

A review is not the place to catalogue what is in a book. Briefly speaking it contains a complete sorting out of the genus Monadenium, so far as material was available, and gives adequate descriptions and figures of all the species recognised by the author. Not only was all the material available examined, which is about as far as most professional botanists can go, but very many previously described species were hunted down in their type localities in order to study and illustrate them properly; not much can be done up to the standard desired by Mr. Bally if only dry herbarium material is relied on. During this work Mr. Bally has had to describe 21 new species, almost half the total number recognised (47). It is obviously not possible for another botanist to comment on the scientific validity of another's work on a group scarcely known to him, but it is apparent that Mr. Bally has steered an admirable middle course between lumping and splitting - all his species have the appearance of being "good" and well characterised. The maps showing distribution of species and characters are ingenious; one of the important by-products of an accurate revision of any group of organisms is that one can then derive biogeographical conclusions without fear; in unrevised groups the basic data are almost always faulty. The excellent index, clear citations, workable key and particularly the index of collectors will make the book easily usable in the herbarium (it would be equally useful in the field but is too beautiful to be taken there).

The only fault, apart from several misprints and slips, which may be found with the work is that the colour plates are loose at the end. All librarians will join with the reviewer to condemn this. Such plates invariably become lost or soiled in copies belonging to libraries. They could surely have been bound in the text at only a slight extra cost.

This book will be necessary to all institutions and private workers dealing with the flora of Africa; it will also appeal to those who find pleasure in the study and cultivation of succulent plants, but above all it can be recommended to all those who enjoy owning beautifully produced books.

B.V.



"THE SEA SHELLS OF DAR ES SALAAM - GASTROPODS."

By

J.F. Spry.

Tanganyika Notes and Records No. 56, pages 1-33 and 8 coloured plates, March 1961.  
(Price of whole journal 12/-, price of separate reprint 6/50; overseas writers should  
add 6d. for postage)

"This is an article by a novice for novices" Mr. Spry states as he begins his article but, as is often the case with such an article, it is of very wide appeal and truly fills a long felt need. The long term project being carried out by the Academy of Natural Sciences in Philadelphia on the Mollusca of the Indo-Pacific area is an elaborate piece of research which will take many years to complete. Mrs. Kaicher's well-known booklets cover a very wide area and do not include all the common East African species. There is no other publication which covers the same ground as Mr. Spry's. Although the title suggests that it is meant only for the residents of Dar es Salaam, shell collectors from Kismayu to Mikindani will find it of great value and will be able to name at least the commoner shells they pick up during their collecting trips. It is a practical work not preoccupied with the vagaries of scientific nomenclature and other details only of interest to the purists. Nearly three hundred species are listed and about half of them are figured in eight pages of coloured plates prepared from excellent water colours painted by the author.

It is natural that there are probably misidentifications of some of the species, but those who know how very difficult it is to get identifications of our molluscs will sympathise with Mr. Spry. Instead of arguing about the finer details of nomenclature how much better it is to produce a useful and practical work. I recommend this paper to all collectors and, I am sure that the author will support me, if I ask that anyone who spots any wrong names should contact him and communicate the details. Although Mr. Spry will plead he has only produced a popular paper for local use he has in fact produced the only available work on the molluscs of our coasts which will be welcomed by all East African collectors and should have a wide sale abroad.

I would like to commend the Tanganyika Society, whose splendid journal has provided a great deal of enjoyment to many readers apart from recording a mass of valuable data, for providing the money for producing such a useful work. I hope that sales throughout the world will completely cover the considerable expense of producing the coloured plates. We look forward to a future work on the bivalves of the same area.

Obtainable from The Tanganyika Society, P.O. Box 511,  
Dar es Salaam, Tanganyika.

B.V.

"AN ILLUSTRATED GUIDE TO THE GRASSES OF UGANDA"

By

K.W. Harker in collaboration with Miss. D. Napper.

63 pages, 123 plates and 1 map, 7¼ x 10¼ inches, Government Printer, Entebbe, Uganda,  
June 1961. Cloth cover, Sh. 22/50 (£1. 2. 6)

Mr. Harker has been working on a survey of Uganda grasses for many years, one of the aims being an illustrated guide. At first he contemplated merely a series of illustrations but when Miss Napper agreed to check the identification and nomenclature of the specimens used in the preparation of the illustrations she suggested that a key was essential and would greatly add to the value of the publication.

The resulting publication is most attractive and should provide a ready means of identifying any grass growing in Uganda; it will also be most useful to workers in western Kenya, north-western Tanganyika and the southern Sudan. Previously, the only available works were the massive but unfinished *Flora of Tropical Africa*, volume 9 and 10 (part 1 only completed) and Bogdan's key to Kenya Grasses (second edition) an unpretentious but nevertheless very useful booklet. Eggeling's "An Annotated List of the Grasses of the Uganda Protectorate" (second edition, 1947) is merely a list which does not help one to name the species. It contains a good deal of information supplementary to the Harker and Napper publication, such as uses, habitat information and some English and vernacular names but must be used with caution since it contains many misidentifications. It is rather a pity that the Harker and Napper publication does not contain cross-references to Eggeling's work so that his information can be used.

The book covers 420 species of Gramineae but excludes the tribe Bambuseae. The Bamboos could surely have been included with very little extra work and expense. All but four of the species keyed are illustrated in the plates. These plates are excellent and it is remarkable that the three artists responsible had had no previous experience of the type of drawing involved. The standard of printing is also high.

Since it is unlikely that the part of the *Flora of Tropical East Africa* dealing with the Gramineae will be issued for many years to come this present volume is bound to be used by far more workers scattered over a wider area than for those for whom it was written. It can be recommended to all persons interested in grasses whether agriculturists with only a strictly practical interest, botanists or amateur collectors. The price for so well illustrated a work is extremely moderate. All persons concerned in its production are to be congratulated.

B.V.

# "BIRDS OF THE SOUTHERN THIRD OF AFRICA" Vol. 1.

By

C.W. Mackworth-Praed and the late Captain C.H.B. Grant.

1962 Longmans, London. Pp. XXIV + 688. 38 coloured plates and 11 plates of photographs, also many black and-white drawings. Marginal maps of distribution for all species and races. English price Sh.50.

This is the third volume in the great series on African birds produced by these two authors - the first two volumes being, of course, our standard work on E. and N.E. Africa. It is sad to note that one of the authors, Captain Grant, died in 1958. African ornithology will for ever be indebted both to him and to Mr. Praed.

This volume is the first of two for the southern third of Africa, which is here taken to include the Union, S.W. Africa, southern Mozambique, S. Rhodesia, Nyasaland, N. Rhodesia and Angola. It describes 581 species - the non-passerines plus broadbills, pittas, larks and wagtails. The format and text are similar to that of the E.A. volumes and of the same high quality. The coloured illustrations are superior to those of the E.A. vol. I and similar to those of vol. II, with the figures against a plain white background. Many of these have been abstracted from E.A. vol. I and are a composite work of several artists, and although quite satisfactory do not bear comparison with a few plates specially drawn for this work by Miss C.E. Talbot Kelly, which are excellent. An attempt has been made to show the scale of the birds on all these plates, with varying success. In the composite plates, particularly, this can have been no easy task and there are some mistakes - e.g. the Lemon Dove on pl.21 is much too big. As with the E.A. volumes there are a number of photographs at the end, many of which are first class.

Perhaps an opinion on certain features of this work compared with Robert's "Birds of South Africa" (1957 edition, by McLachlan and Liversidge) may be of interest?

## Bird Ringing

Area covered. Praed covers the whole of Robert's area plus Angola, N. Rhodesia and Nyasaland.

Number of volumes. Roberts, one; Praed, two (one to come).

Identification. Praed caters primarily for the collector, with descriptions which are mainly systematic linked to dichotomous keys for identifying specimens in the hand. Roberts caters primarily for the observer, with (in the revised edition) descriptions for use in the field. There are no keys either for field or for systematic use.

Indexing. At the start, both books have suitable lists of families described and of plates. At the end, Roberts has no fewer than four alphabetical indices - English, Latin, Africaans and Native - for his 875 species, taking up 32 pages. Praed has only an alphabetical Latin index for his 581 species and it takes up 26 pages. The lack of an English index is my main criticism of this book.

Other features. Both books have valuable notes on habits and on distribution (with marginal maps) and are well and copiously illustrated.

To what extent will ornithologists in East Africa need this third volume of Praed (bearing in mind that they will be sure to have the first two volumes and probably Roberts too)? Well, it is by no means essential, but anyone who takes a general interest in African birds and can afford the price is strongly recommended to obtain it. In particular, bear in mind that this is the first book which fully describes and illustrates the birds of Angola, N. Rhodesia and Nyasaland, apart from many other valuable features.

M.E.W.N.

### BIRD RINGING REPORT FOR 1960/61

During this period the following birds were ringed at the Nairobi Sewage Works, Eastleigh:

Yellow Wagtails .....	585
Red-backed Shrikes .....	2
Caspian Whitethroat .....	1
Sedge Warbler .....	1

Of these, 11 Wagtails were retrapped at the site of ringing. Two birds ringed on 17th December, 1960 were retrapped on 1st. April 1961.

By the end of the season we had five members holding permits to trap birds for ringing purposes. We also had some welcome assistance from other members who accompanied us from time to time.

No ringing was done in either Tanganyika or Uganda during this season.

E.J. Blencowe.



## Appreciations

On January 29th 1962 the death occurred in Neuchâtel (Switzerland) of Mr. Jacques J. Richard who had farmed in Solai for sixteen years; although he retired from Kenya with his family ten years ago he had left many friends in the country who esteemed him and who remember him for his sterling qualities, as a loyal friend as well as a successful farmer.

Jacques Richard had other merits, known only to his closest friends, for he was essentially modest and rarely mentioned his deep and active interest in a very specialized branch of science: Volcanology. He was an authority on the world's active volcanoes, a subject to which he devoted a great deal of his time and which he pursued with the drive and energy characteristic of the man.

Before arriving in Kenya in 1936 he had spent ten years in Java as a planter and it was there that the many active volcanoes and craters aroused his interest; he visited and explored all those which were accessible, accumulating a wealth of invaluable data, often risking his life in perilous investigation during active eruptions.

In East Africa Jacques continued his volcanological studies, and when in 1947/48 the memorable eruption of Kitura in the Congo took place, he was one of the first on the spot. His magnificent colour films of these repeated eruptions - including the birth of a small new volcano which he showed to his fellow members of the East Africa Natural History Society and subsequently in Europe, are unique documents.

But his interest extended also to the less dramatic aspects of volcanology. He studied the extinct and dormant craters in East Africa, in the first place Mt. Kilimanjaro which he climbed many times; he was, indeed, the first European who spent the night in the crater itself, where he discovered and filmed active fumaroles and found deposits of pure sulphur.

Suspecting a relationship of local rainfall with hidden volcanic activity, he placed permanent raingauges on the mountain at various altitudes at his own expense and organized readings at regular intervals, an initiative which was subsequently continued by the Tanganyika Meteorological Service.

A full account of his surveys of Kilimanjaro was published in the East Africa Natural History Society's Journal.

Shortly after its eruption in 1940/41 Jacques climbed Lengai, the most active of the East African volcanoes in order to study its significance in the overall volcanic formation of the Rift Valley; these observations too were published in the Society's Journal.

After leaving Kenya in 1952 Jacques Richard continued his volcanological research. The eruption of Mt. Etna in Sicily a few years ago was an opportunity not to be missed; his film, taken at great personal risk, is outstanding. He made his last important

## Appreciations

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expedition in 1959 when - with a Belgian collaborator - he visited an active volcano in the New Hebrides on behalf of the Condominion's Government, to assess its potential danger to the indigenous population and to submit proposals for eventual precautions to be taken for its safety. After completion of this task he spent two months on a survey of the volcanoes of the entire island-group, to be included in the "Catalogue of the Active Volcanoes of the World" published by the International Association of Volcanology. His most important contribution to the "Catalogue" was a comprehensive account of the volcanoes of East Africa which appeared in 1960.

For his numerous and valuable contributions to science Jacques Richard was awarded a Fellowship of the Royal Geographical Society as well as the Membership of the "Société des Explorateurs" in Paris.

He leaves a widow and three daughters, all married in England. It was only two days after he had given away his youngest daughter in marriage when his fatal illness overtook him. He will be remembered and deeply missed by his friends who extend their deepest sympathy to his widow and to his children in their loss.

P.R.O.B.

Mrs. Sybil Albrechtsen  
(1877 - 1961)

Around the years 1930-34 several ladies were collecting plants for the Coryndon Museum Herbarium, then in the charge of Miss Napier (later the Hon. Mrs. Evelyn Molony) who died some years ago. These specimens are well-prepared and duplicates of most are in the Kew Herbarium; as a consequence, the names of these ladies are frequently seen in lists of citations in botanical literature. Quite a few of the plants added to the collection during this period were collected by Mrs. Albrechtsen. Exactly how many she collected could only now be ascertained by working through the entire herbarium but one receives the impression that it must be several hundred, since the name is frequently seen on labels as material is worked through during the course of routine naming.

Mrs. Albrechtsen was born in 1877 in Devonshire, into a family with a strong Swiss background, and in her early twenties went to Scale Howe at Ambleside to train as a teacher. It was here, mainly as a result of the influence of the College's founder, Charlotte Mason, that Mrs. Albrechtsen's interest in natural history began to develop.

She came to Kenya in 1910 and lived successively at Limuru, Nakuru and in the Rift Valley. In 1927 she went to live on the South Kinangop and it was there that she made the collection now in the East African Herbarium. A keen teacher, she opened a school at Naivasha in 1934 but was forced to close it in 1941. She also lived in Nairobi and at Eldoret. She continued to teach until the

eve of her 80th year, a remarkable effort, but was obliged to retire through ill health though retaining her great interest in everything going on around her until the end of her life. She died on the 15th. September 1961. Her very interesting diaries have been presented to the library of the Coryndon Museum.

B.V

(Note. I am much indebted to her daughter Mrs. P. Jeffreys for most of the above information and also to Miss J. Ossent for her help in obtaining it.)

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Dr. Vernon D. van Someren, M.B.E., B.Sc., Ph.D.  
(1915 - 1962)

Dr. Vernon D. van Someren, M.B.E., B.Sc., Ph.D. Died suddenly at Jinja on March 28th.

He was a member of an old and distinguished East African family, his father Dr. R.A.L. van Someren and uncle- Mr. V.G.L. van Someren arrived in Kenya in 1905.

Vernon was born at Jinja in 1915 and later went to Scotland with his family where he was educated. He returned to Kenya in 1939, when he joined the Veterinary Department. He later transferred to Fisheries and his detailed studies at Sagana of trout under tropical conditions was the first in this field and led to many new discoveries. In more recent years he was Director of the Freshwater Fisheries Research Organisation, and studied the indigenous fish of East Africa.

Vernon was always keen on Natural History, and was a noted Ornithologist. During the war he served with the East African Medical Corps and any spare moments he had were spent watching and photographing birds. His study of the birds of Madagascar was a noteworthy contribution to the knowledge of the species of that island.

Later he wrote on the behaviour of Fiscal Shrikes, Jackson's Whydahs, and Oxpeckers.

His book "A bird watcher in Kenya" is delightful and informative and much appreciated by bird watchers.

For many years Vernon was a member of the East Africa Natural History Society Committee and he later became a Trustee of the Coryndon Museum.

Vernon will be sadly missed by his many friends and to his wife and family all members of the Society wish to express their deepest sympathy.

W.P.L





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